

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

*Moderator Janet:* Good evening! Welcome to the Lyrid chat. We are having a bit of technical difficulty and are working to resolve it. Dr. Cooke and his team will be with you all shortly. It gonna be a great night!

Cris: what time will you be able to see the meteor shower in central time?

Smeak: Evening guys...It is overcast where I live. Hope it clears up at some point for me

Rhiannon: Evening Smeak! We hope it clears up for you too... and for us as well!

Dan: The most recent ZHR calculation at [www.imo.net](http://www.imo.net) is 25, based on observations 3 hours ago - any more recent activity numbers around?

Bill: The latest is the IMO 25.

Minicop: when will the meteor shower arrive in windsor ontario

Bill: You should see Lyrids between midnight and dawn.

Sispastro; What does lyrids mainly consist of?

Rhiannon: A Lyrid meteor is a piece of ice/dust from comet Thatcher.

*Moderator Brooke:* Hello everyone, and welcome! Janet and I are here to help out with the chat tonight. Let us know if you have any issues. Biil, Danielle, and Rhiannon are starting to answer your questions. Enjoy the Lyrids!

Jakey: I am in Barbados and i can see the Big Dipper was just wondering where i should look with reference to there to see a meteor ?

Rhiannon: Your best bet is to lie on your back, and take in as much sky as you can. Let your eyes dark adjust (can take 30-40 minutes) and enjoy! We hope you see some Lyrids. ☺

JBeauchamp: Just got another one on radar and video :)

Rhiannon: Fantastic!

kenny\_c; What are the sky conditions at the Space Flight center? Cloudy and rain in eastern NC

Bill: Cloudy. We're hoping they will clear later.

Brenda: Is it possible to predict the peak?

Rhiannon: Yes. We can see from previous years that the peak usually occurs at 5:30 UTC on April 22nd... in a few hours!! :)

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
April 21, 2012**

---

Minicop: what do lyrids look like will i notice them

Bill: The Lyrids will appear like a streak across part of the sky. Hence the name "shooting star."

Mike: What time will the meteor shower arrive around Lexington, Kentucky?

Rhiannon: You can start to see Lyrids as soon as it gets dark... but your best bet is between midnight and sunrise.

Dillon: Will the hubble telescope be able to take pictures of the meteor shower and if so when will they be posted?

Bill: The Hubble Telescope has too small a field of view to observe meteors. It was not designed to look down at Earth.

Kathy: Do you recommend binoculars?

Rhiannon: No. You want to see the most sky possible. So just lying on your back and watching with your naked eye is what we recommend!

Ken: Hi. what time in the philippines will the meteor shower show?

Bill: Between midnight and dawn.

Vicki: my video feed is just a grey screen (a blurred one)

Rhiannon: That is because we have clouds here in Huntsville, Alabama, currently. We are hoping that the skies clear up later tonight!

Ciel: It's cloudy in Toronto; any chances that we'll get a clear sky to view the stars?

Bill: Check your local weather on the web or local TV channel.

SeaEagle: Are there other sites that have video set up for viewing? It looks like Huntsville is overcast.

Rhiannon: There is a link above (in the article) for other cameras.

Bracketeer: i see the weather has not cleared up yet?

*Moderator Brooke:* It's still cloudy, darn it. ☹ We're looking and hoping for clearing skies later, estimating 2:00 a.m. Central.

lili098: Will astronauts on the ISS be able to view the meteors?

Bill: Yes, but they will be looking down at Earth and see the meteors below them.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Serapis: How fast are they moving exactly? Are they continually picking up speed with every pass?

Rhiannon: They are hitting the Earth's atmosphere at 49 km/s... or 110,000 miles per hour!

Tiago: at time it starts?:) here on portugal are 4.11 am :D

Bill: You have just about an hour before dawn, at which point the Lyrid show will be over for the night. There will be a few tomorrow night, if you wish to look.

Dillon: Why are none of my questions being answered?

Rhiannon: We receive many, *many* questions and are trying to answer as many as possible.

Lovelikewoe402: What Time Will The Meteors Fall Tonight?

*Moderator Brooke:* Throughout the night, with the best viewing being just before dawn, your local time. A few tomorrow night, but less than tonight.

Dillon; what is the proablity of a meteor hitting earth?

Bill: 100% or you wouldn't be seeing a meteor shower. If you are talking about an asteroid, we know of no large asteroids with a significant chance of hitting Earth.

Kirsed; How much sky does this camera pick up?

Rhiannon: The stream on this website has a 25 degree field of view.

*Moderator Brooke:* For everyone viewing in North America, the best viewing times tonight will be between midnight and dawn, your local time. Try to find dark skies away from city lights...give your eyes time to dark-adapt, then enjoy!

Raincloud: Do they make it to Earth's surface or bust up in the atmosphere?

Rhiannon: All Lyrids burn up by about 70 km high. None make it to Earth. You don't have to worry about being hit by a Lyrid tonight. 😊

Serapis: Good Evening!

*Moderator Brooke:* Hello Serapis -- thanks for being here. 😊

Illinois: How is the frequency of meteors per hour determined?

Bill: The number of meteors per hour is counted by visual observers and this number is corrected for sky conditions and altitude of the shower radiant.

Arjun; should i look directly at lyria to see the meteor shwoer?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: No. It is best to look straight up. Lie on your back and take in as much sky as possible. We hope to see some!

Bertuccia; what am i looking at? all i see is gray static

Bill: You are looking at clouds and the static is noise in the camera.

Serapis: What path do they take? Meaning what do they pass after us and further out?

Bill: They do not continue after striking Earth, but burn up in the atmosphere. Any meteor you see is ending its journey above our heads.

lili098: How often does this occur?

Rhiannon: The Lyrids occur every April, which corresponds to the Earth travelling through a stream of debris left by comet Thatcher. There are dozens of other meteor showers that occur yearly. Some are very spectacular (Perseids, Geminids) but some you will hardly notice.

Cris: its really clear outside i can see alot of stars clearly and the planets and the orion nebula

Bill: Congrats. Wish we had clear skies here.

Dan: Do you know at which time (PDT or better UTC :-)) the student camera balloon mentioned in your press release will be launched?

Rhiannon: It is being prepared currently, launch will be around midnight... give or take an hour. We are excited to see what it will bring us!

Minicop : in windsor ontario the sky is clear will i see any

Rhiannon: Hello fellow Canadian. ☺ Yes if your sky is clear you will have a good chance of seeing many Lyrids. The best viewing time will be midnight to sunrise local time.

Vicki: I live in a apartment building, that has a balcony that faces north west, will I be able to see the meteor showers

Bill: You need to go outside and let your eyes dark-adapt. You want to look up and see as much of the sky as possible. You probably won't see many meteors looking to the northwest.

Adnil: How often do you offer this live video stream and chat for meteor showers? Great idea (overcast in N.S, Can.)

Rhiannon: Thanks for the feedback! We have been trying to offer this during every major meteor shower (i.e. Perseids, Geminids)

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

JessyMatar: It's the morning And I can't see anything anymore !! I hope i can the lyrids on the video..

Rhiannon: We are hoping that our Huntsville skies will clear up and we will get to see Lyrids here, too!

FatherEduard: Will it be possible to see any Lyrids from within the city, or are the lights too bright?

Bill: City lights are too bright to see significant numbers of meteors. You need a dark sky.

Demitra: will there be footage from the ISS that will be viewable?

Bill: It will probably be posted somewhere in the next several days.

Ken: will the Lyrid meteor shower be drastic?

Rhiannon: The Lyrid meteor shower is not a major shower, but it is still quite nice, and because there is no moon tonight, the skies will be extra dark. This makes for excellent viewing conditions! If you go out to observe, be sure to check out Saturn, Mars, and many constellations!

Cris: Am i going to be able to see it in Katy texas at 11 pm central time, like in my backyard i can see all the stars, and orion clearly so will i be able to see the meteor shower??

Bill: Yes, you'll be able to see the meteor shower as long as there are no bright lights around the sky remains clear.

Revljs: It's raining here in Atlanta. Hope it clears up!

Bill: We do, too!

Adskds: What happened to the comet Thatcher?

Rhiannon: Comet Thatcher is still likely alive. It was discovered in 1861 and has a period of 415 years, meaning it won't come by Earth again until 2276.

Sam: Is it going to be visible in ottawa?

Rhiannon: The Lyrids are visible all over the world, other than the Antarctic.

Johnwesleyharding: my skies here in maine are clear currently, but will be clouding over soon -- is it worth going outside to see if i can see anything this early?

Bill: If it is clear around eleven, you may have a chance at seeing a Lyrid or two, so yes.

*Moderator Brooke:* We're clouded out over Huntsville for now, so our camera is showing as a gray box. Try some of the other cameras we're aware of on this page:

<http://www.nasa.gov/connect/chat/allsky.html>

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

kenny\_c: How far is the balloon expected to drift? I assume it goes from west to the east?

Bill: Depends on the wind. Hopefully not too far. Don't want to have to chase it down.

Minicop: what will it look like will i notice it

Rhiannon: It will look like a streak of light across the sky. A 'shooting star'. Hopefully you get to see some nice ones!

Guest: is the webcam showing skys or is it still light out?

Rhiannon: The webcam right now is just showing clouds. Hopefully it will clear up in a few hours!

lili098: Are there any chances of having some meteor's not burn up while entering the atmosphere?

Bill: The Lyrids completely burn up like practically all shower meteors. Occasionally, a meteor from the asteroid belt can produce meteorites on the ground.

Cris: If you can see the stars outside clearly and orion will i'll be able to see the meteor shower?

Bill: Yes.

Tristan: I looked in my back yard a few times, could not find anything. Got any advice?

Bill: Need to stay outside and let your eyes dark-adapt. Occasional sneak peeks are not going to yield many meteors.

JoAnn: comet is Thatcher- any info on how this was named and how long the lyrids have been chronicaled as a repeated event

Bill: The Lyrids have been observed since 687 B.C. Comet Thatcher was named after its discoverer, as are all comets.

Vicki: is there a map, I can find to see where everything (stars, planets) are located, this is my first time watching the meteor showers. so i can't differentiate anything, from anything

Rhiannon: There are some great programs that will help you with this. Some free and some cost \$\$\$. Celestia, Stellarium, [www.heavens-above.com](http://www.heavens-above.com), are some examples. There are other good websites that can tell you which direction to look to see planets. Also there are some great apps for the iPhone and iPad that point constellations and planets out. ☺

Carolbear: Are the Lyrids the oldest meteor shower?

Bill: The Lyrids have been observed the longest.

Sispastro: will we get video feeds from the ISS online?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html) Here ya go!

Sispastro: how old is the comet Thatcher? And have astronomers studied lyrids in detail? If yes, how?

Bill: Comet Thatcher, like all comets, is billions of years old. Lyrids have been studied by astronomers since the 19th Century, first with visual observations, then photographic and now video/spectrographic.

A.D.Young: This is amazing. Do you all work for NASA?

Danielle: We all work at NASA Marshall Space Flight Center

Marley: Over the observed 2600 year history for the lyrid meteor showers, which one was the most unique thus far and why?

Bill: The 1982 Lyrids, which had a rate of nearly 100 per hour, is the one that stands out to me.

Cris: around 11 pm central time right?

Bill: 11 p.m. local time.

Geoff: This is a great idea. We are overcast here and there is no opening expected. Glad you have this coverage here. This gives us one window at least. Thank you for doing this.

Danielle: Thanks, Geoff. We love doing chats and getting people excited about meteors!

Serapis: What is the average size of the meteors?

Bill: Average size of meteors is about 0.1 to 1 millimeters.

Kathy: When might be the best time to see Lyrids in Northeastern Kansas

Bill: Midnight to dawn local time.

A.D.Young: Is the view still cloudy where this is being conducted in Alabama?

Bill: Yes.

starnerd87: I live in Pennsylvania and we have cloudy skies and rain where can I watch this meteor shower?

Bill: It's going to be hard if it's cloudy and rainy.

Roni: How many meteors per hour are being reported this year with the Lyrid shower?

Danielle: Right now, the International Meteor Organization is reporting ZHR observations of 25 Lyrid meteors per hour. Check out <http://www.imo.net>

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

SnoopLogg: Hi, just thought I'd mention about the maps question, Google Sky Map is available for smartphones and is free, it shows Lyrids on that :D

Danielle: I didn't know that! Thanks for the info, SnoopLogg!

Johnwesleyharding: out of all the annual meteor showers, which is the most potent, if you will, in the northern hemisphere? which yield the best results in terms of hourly rate and visibility?

Bill: That would be the Leonids, which may have attained 100,000 meteors per hour in 1966.

NCJon: Cloudy in Charlotte, NC, too - and will be all night- so disappointed!

Danielle: I feel your pain, NCJon ☹

Ken: what's the cause of the Lyrid meteor shower?

Bill: Lyrids are debris left behind in the orbit of Comet Thatcher.

Raincloud: Any thoughts about the showers being observed from so long ago, but not the comet?

Bill: Yes. The meteors that have been seen have drifted far enough away from the comet's orbit to strike Earth. The comet, fortunately, is not going to strike Earth and requires a telescope to be seen.

Arjun: what do the meteors look like to the naked eye?

Bill: A streak of light lasting a couple of seconds.

Sispastro: what causes the differences in the rate of the meteor shower each time it occurs?

Bill: Moonlight, amount of material striking Earth are the major factors.

Vicki: What does the term dark-adapt mean? Looking at previous questions you said a sneak peak wont help you spot and meteors, is it really that much of a difference?

Bill: It takes your eyes about thirty to forty minutes to fully accommodate dark conditions. In less than this time, your eyes are not at their full sensitivity and you will miss the dimmer meteors.

A.D.Young: I am in Memphis, Tennessee. If I go outside and look, which part of the sky do I need to look at?

Bill: Lie flat on your back and look straight up.

Guest: can we still see the meteor shower tomorrow

Bill: You will be able to see Lyrids tomorrow, but fewer than tonight.



**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Guest: When will be the last day to see meteors from this shower

Bill: Tomorrow is about it for the Lyrids.

Vicki: when do the Leonids meteor showers appear?

Bill: Mid-November of each year.

JBeauchamp: Just FYI - ISS is about to make another pass over the Eastern US, about 45 minutes. It won't be visible, but good timing for the peak and dark skies.

Danielle: Thanks, and good to see you here! I think the first ISS pass starts at 10:52, in about 25 minutes, last I checked.

A.D.Young: Is this the first online viewing of a meteor shower event in internet history?

Bill: No, we've done this several times before.

Shalasax: Hello, If I live in Thunder Bay Ontario Canada (on the northern bit of Lake Superior) which direction should I be looking to see the meteor shower :) ?

Rhiannon: Lie on your back and look up. Take in as much sky as possible. And let your eyes adjust to the dark. We hope you see many!! ☺

Yosemiteviewer: The skies are clear over the Sierra Nevada Mtns west of Yosemite. Is viewing time after midnight?

Bill: Yes.

Pommy\_Mommy: I live in Little Rock Ark it is very clear outside so which way should I be looking

Danielle: I'm jealous of your clear skies!!! No need to look in any particular direction -- just look up!!

Grumfuld: so the best time to observe this is after midnight?

Bill: Yes.

Vicki: Can you just sit on a chair, instead of lying on your back,?

Rhiannon: I suppose. ☺ It would be nice if you have a chair that reclined all the way back! We just recommend getting to a spot in which you can see the most sky possible.

Ciel: Is there any chance of being able to see a fireball tonight

Bill: If you have clear skies, the odds are good. Our cameras saw four Lyrid fire balls last night.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Arjun: what is the most active meteor shower this year? is it geminid?

Danielle: The Perseids in August and the Geminids in December are both very active. I prefer the Geminids myself -- they've never failed me. 😊

x3phillips: What was that ISS link again?

Rhiannon: [www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Geoff: I like the idea of putting a camera on a balloon. As an amateur astronomer it is so hard to do a program when it is overcast. Great idea to launch above it.

Bill: Thanks. Hopefully, it will work out.

A.D.Young: You may have missed my Question..... What part of the sky do I need to be looking toward, I live in Memphis, TN

Bill: Lie on your back and look straight up.

Missyleigh: Watching from Columbus Air Force base in Columbus, MS! We're gonna head out in about an hour!

Bill: Awesome! Let us know how it turns out.

Vicki: What are the peak times to see the meteors in Toronto, Canada?

Bill: After midnight and before dawn.

Missyleigh: Will this shower be similar to the 1994 shower?

Rhiannon: We expect between 10-20 per hour tonight. [www.imo.net](http://www.imo.net) has an automated live-updating shower graph showing how many Lyrids are being seen currently.

A.D.Young: Is the Leonid Meteor shower have any relation to this one tonight?

Danielle: Nope. They are 2 different meteor showers caused by debris from 2 different comets.

Raystram: What is the average size of the meteors as they hit the atmosphere?

Danielle: They are millimeter to centimeter sized particles

*Moderator Brooke:* Getting lots of questions about the best way to view meteors. Find a place with dark skies, away from city lights. Give your eyes 30-40 minutes to dark-adjust. Lie on your back and look straight up.

Adnil: so as kids we were told it is a shooting star, but it's actually a meteor that we saw?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: Yes. You were not seeing true shooting stars. What you were seeing were pieces of dust/rock/ice burning up in the atmosphere -- still very cool!

Samson: If the Earth passes through debris left in the orbit of comets, why are there meteor showers every year? Wouldn't have all of the debris been burned up already the first time the Earth passed through them?

Bill: Because comets shed a lot of debris and the debris particles follow slight different orbits. Some strike Earth this year, whereas others will have orbits that cause them to hit in the past or in the future.

Arjun: how big is the comet thatcher?

Bill: Less than five kilometers in diameter.

Ddockery: I understand the space station crew are watching for the Lyrids. are we able to view that video online also.

Rhiannon: You can see a live-feed from the ISS on this link:  
[http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

moltaire76: why is the screen still grey?

Bill: Because the sky is still cloudy.

Cris: Can someone answer my question please so around 11 pm central time i will be able to see the meteor shower or what time in central time??

Danielle: Yes, you should be able to see Lyrids at 11 pm in your time zone as the Lyrid radiant is above the horizon. We expect the rates to peak around 5:30 UTC, or 12:30 am central time, however.

ToolMan: When will the film me out from the ballon and where can we see it?

Bill: The SD card containing the video will be shipped back to us for analysis and we will post results on the NASA Meteor Watch page. <http://www.facebook.com/nasameteorwatch>

Minicop: i was just out side and what do i look for or what do the lyrids look like what am i expecting will it be small by the way i live in windsor ontario its 11:40pm here

StarStruck: Can you please give us the full correct link to the International Space Station live camera feed? Thank you.

Rhiannon: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

JessyMatar: i just saw oneeeeeeeeeee!!

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Congrats!

Missyleigh: The clouds should clear out of Huntsville by 2AM. Will the Ustream screen clear up when the clouds roll out?

Rhiannon: We are hoping so! I was just outside and it looks like they are already beginning to break. ☺

Minicop: u may have missed my question: i was just out side and what do i look for or what do the lyrids look like what am i expecting will it be small by the way i live in windsor ontario its 11:40pm here

Bill: We have posted videos of Lyrid meteors at [www.facebook.com/nasameteorwatch](http://www.facebook.com/nasameteorwatch). Those will give you a good idea of what a bright Lyrid will look like.

Serapis: What are the odds of the ISS being hit by one? Does the ISS go through the path of these? Has it been hit by anything that caused damage?

Danielle: The odds are very low that ISS will be struck by a Lyrid. ISS is heavily armored though -- its shield protects it against meteoroids up to 1 inch in diameter.

Vicki: What are fireballs?

Bill: Fireballs are meteor brighter than the planet Venus.

Raincloud: Are all meteor showers always viewable worldwide, or do they sometimes only appear in certain areas? Is it always recommended to look up and take in as much sky as possible or do you sometimes have to look towards a certain area?

Rhiannon: It depends where the radiant is. The radiant is the area of the sky which a meteor appears to come from. For example, the Lyrids all appear to come from the constellation Lyra. If you are able to see the constellation Lyra (which most of the world is at some point, tonight), you have a chance of seeing Lyrids. ☺

Roni: For those of us in Southern California, and Las Vegas area - when is best to view this shower?

Bill: After midnight and before dawn.

Kirsed: how fast does the ISS orbit the earth?

Rhiannon: Every 92 minutes!

blueberrie\_cuppiecake: When is the projected peak of the shower?

Danielle: The peak is expected to occur around 5:30 UTC on April 22. That's 1:30 eastern time.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

JoAnn: Puebla Mexico and skys are beginning to clear- It is great to have this chat arrangement. What distinguishes a fireball from a regular shooting star and appologies if this has already been asked.

Bill: A fireball is a meteor brighter than the planet Venus. Since the brightness of a meteor is related to its size, the bigger the brighter. A fireball is a larger than average size meteor.

Vicki: I just saw one... probably the only one ill see tonight, cause its starting to get a bit cloudy

Bill: Congrats! Glad you saw one.

Steved: im in metro detroit...i cant see nothin...are they out yet???

Rhiannon: If you have clear skies you have the possibility of seeing Lyrids. You will be able to see many more from midnight to sunrise, though. The later you stay out, the better.

*Moderator Brooke:* We're still clouded-in here in Huntsville -- you might try for better views on some of the links in our all-sky network: <http://www.nasa.gov/connect/chat/allsky.html> And if you know of other cameras that are live, email those to [cd70web@msfc.nasa.gov](mailto:cd70web@msfc.nasa.gov), and we'll share them on the allsky page.

blueberrie\_cuppiecake: For those of us in New England, when is the best time to watch?

Bill: Between midnight and dawn local time.

Arjun: how big is a meteor not to the naked eye but actual diameter if its small how are we able to see it?

Danielle: These meteoroids are millimeter and centimeter sized particles. When they enter the atmosphere they "burn up" and create long streaks of light we can see with our naked eye.

JessyMatar: is it periodic the movement of meteors??

Bill: No, because meteors burn up in the atmosphere and exist no more after this. Before hitting Earth, they moved in orbits just like the planets and asteroids, so that part of their life can be thought of as periodic.

Arjun: can you see a meteor from inside when its raining and cloudy

Danielle: Only if you are looking at a live video feed of the night sky online. ☺

Ktradley: i am going to set my alarm tonight to see the showers, when should i set it for the best time/

Bill: Midnight to dawn local time.

moltaire76: what is the video showing the iss for

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Danielle: Astronaut Don Pettit will be attempting to observe the Lyrid meteor shower from onboard the International Space Station tonight! ☺

Cloudyinmaine: is there a denser area predicted and where and when on the globe will it occur?

Bill: No. The Lyrids last two to three days so anyone north of Antarctica has a shot of seeing a Lyrid.

Vicki: I canTheres something that seems to be moving, is it something thats called Hydra?

Bill: If you are referring to the video feed, those are clouds.

*Moderator Brooke:* For those who have asked, this is where you can view the ISS live Ustream feed:  
[http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

starnerd87: Have a Good Night and Happy Meteor Watching everyone :-)

Rhiannon: Thanks!

Minicop: will they be moving very quick or still like a star

Danielle: Lyrids move very quickly at 110,000 mph! A Lyrid meteor would travel from New York City to Los Angeles in under 2 minutes!

CLK: It's clear in central Texas - so we're hoping to have a good show.

Rhiannon: Fantastic! I am a bit jealous. Hoping you get to see many great meteors! Check out some planets and constellations while you are out -- having no moon makes for great stargazing conditions!

Dan: Wonderful, 500+ people staring at clouds remotely via UStream ... What is that camera's field of view and limiting magnitude once it clears up?

Bill: Camera field of view is approximately 25 degrees and limiting stellar magnitude is six to seven which means it will show fourth to fifth magnitude meteors.

JessyMatar: why the meteors comes constantly on april and august of every year??

Bill: Because the Earth runs into the dust trails of comets Thatcher and Swift-Tuttle at those times.

moltaire76: does anyone know when the clouds are supposed to blow over

Bill: Hopefully, in a couple of hours.

Adnil: will the ISS view be the same as viewing from Earth? just want to know what to look for from the live stream

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: Viewing meteors from the ISS means that you will look down instead of up! The ISS orbits at about 400 km up, and Lyrids burn up between 120-70 km up. Therefore the astronauts would need to look down. Pretty neat. ☺

Ktradley: will they be noticable or do we have to keep looking hard to see them?

Danielle: They will be quick streaks of light that will vary in brightness. You'll have to look hard to see the faint meteors, but the brighter ones should be obvious. They just travel very quickly, so if you look away for a second you might miss one! Another piece of advice: when you go out to observe the shower, make sure you give your eyes lots of time to adjust to the dark. This can take 30-45 minutes.

Raincloud: This chat is awesome! It's also been noted Saturn and Mars are bright in our sky tonight. Do we often have planets lighting up the night? Does one need to calculate a lot of orbits to know when they're most visible?

Bill: There are always planets lighting the night sky, either in the evening or in the pre-dawn hours. Calculating their visibility is fairly simple and has been done for many centuries.

Serapis: Watch the ISS feed! I saw one there! They dimmed the light on the ISS to make it easier.

Rhiannon: The ISS just had sunset. There may be some lighting visible if they pass over storms, or some cosmic ray streaks. Don't confuse those with meteors. You'll know a meteor if you see one. We are crossing our fingers for one!

llovejessy: if the meteors are just millimeters how can we see em with our naked eyes this clearly ??

Bill: You are not seeing the one millimeter piece of debris; you are seeing the light generated as it burns up in the atmosphere.

Ktradley: how notticable will the showers be? is it something to be constantly scanning the sky, or will they be fairly visible

Bill: You need to keep your eyes on the sky. Lyrids typically only last one to two seconds and at most, you'll see about fifteen per hour.

Vicki: Sad, how theres a bar right beside my building, and theres thugs coming out of it, at random hours, gotta kep walking back into my apartment form my balcony, everytime i see one.

Bill: Be safe.

JMMan10: Good evening. On my Google sky map (smartphone app) i can see Lyrids and Eta Aquariids what is the difference?

Bill: The Lyrids are debris from Comet Thatcher and the Eta Aquariids are pieces of Comet Halley.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Ktradley: should we see some between 12am-1am? or is it best to look around 4-5am?

Bill: Yes, you will see some and, yes, you will see more before dawn.

NorfolkMA: Where to look in the sky fro best chance to see them?

Bill: Straight up.

Vicki: How bright will the meteors be?

Rhiannon: With your naked eye the average meteor will be about +1 or 0th magnitude.

Sam: This is all so cool! Thanks for answering all the questions! Hope I get to see a few tonight!

Rhiannon: Glad you are enjoying it! Keep your questions coming. ☺

moltaire76: are the moderators viewing the same camera as we are?

Danielle: We are viewing the UStream feed (it's gray right now since the sky is cloudy) and we also have links to other cameras both on the ISS ([http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)) and elsewhere (<http://www.nasa.gov/connect/chat/allsky.html>)

Vicki: What direction do we have to face to see them?

Rhiannon: Lie on your back and look up. Try to take in as much sky as possible and let your eyes dark-adjust. It can take 30-40 minutes for them to fully adjust. If you can see all the stars of the little dipper... you have good dark skies.

Cris: So i'll be able to see it around 11 pm central time? and in Katy Texas?

Rhiannon: The best time for you to view them is between midnight and 6 am local time. Though you may be able to see some once it gets dark.

Berlin\_Pennsylvania: when will the meteor shower show the most meteors?

Rhiannon: Between midnight and 6 a.m. local time. You can expect to see 10-20 per hour if you have nice dark skies! You can check out [www.imo.net](http://www.imo.net) to see live-results of observers around the world.

Ktradley: does this happen every year? or is this a "every X Years"?

Danielle: The Lyrids happen every year, though they vary in intensity -- for example, this year we expected 15-20 meteors per hour at the peak. But in 1982 the rates reached 90 meteors per hour. There is some data to suggest, however, that there is an enhanced probability of detecting higher rates every 12 years or so.

StarStruck: Have any Lyrid meteors fallen to earth? Any evidence of that?



**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: There have been no Lyrid meteorites (meteorite = once a meteor has landed on the earth).  
Lyrids all burn up by 70 km up.

Raincloud: Who were some of the early observers of the Lyrid showers, and how ere they documented?  
2,600 years ago is pretty ancient :)

Rhiannon: The Chinese documented meteor showers quite well, actually! In 687 BC, Zuo Zhuan recorded 'On day min-mao of month 4 in the summer (of year 7 of King Zhuang of Lu), at night, fixed stars are invisible, at midnight, stars dropped down like rain." Keeping in mind the calendar used at the time, this would correspond to the Lyrids. Pretty neat! There was a large gap of time until the next observations though, and the Lyrids were not recognized as a shower until 1835.

Arjun: what age did you guys start getting an interest in astronomy? im 12 and want to be an astrophysicist

Danielle: That's great!!! I've always loved space. I think I was 8 years old when I first saw the show Star Trek and I was just fascinated by what might be out there. I started to read anything about astronomy that I could get my hands on.

Vicki: What is COSMOS 2428 and COSMOS1500? i see them on a star chart making their way slowly across The skies Here but i can't spot them.

Bill: Those are man-made Earth-orbiting satellites launched by the Russians.

StarStruck: Where are you, Rhiannon and Bill?

Rhiannon: Bill, Danielle and I are all located at Marshall Space Flight Center in Huntsville Alabama (Rocket City, USA ☺)

js\_chen58: The peak time is 12:30. Will we still see more before dawn instead of at the peak time? And why?

Bill: Yes, because the radiant is higher in the sky.

ThinkVegas: I live in a suburban area and won't be able to avoid the associated light pollution unfortunately tonight. Do you recommend using binnoculars or will that create too narrow a field of view?

Danielle: I grew up in a suburb of Chicago, so I know how bad the light pollution can be. ☹ It wasn't until I moved 2 hours away from the city that I could see the Milky Way. We don't recommend using binoculars for exactly that reason -- the field of view is too small. You want to use your eyes to see the largest field of view possible.

Sam: watching the ISS livestream and seeing lots of bright lights. are those meteors??

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Looks like lightning to me.

Berlin\_Pennsylvania; i just saw one!!! They are spectacular!

Bill: Congrats!

StarStruck; I'm heading down to the beach right now, to watch this in person. Wish me luck! Thanks for this, NASA. I'm a fan.

Bill: Good luck!

*Moderator Brooke:* So what kind of luck is everyone having with the Lyrids watching? Are you seeing some good ones tonight? Let us know what you're seeing in your hometown.

Ktradley: when will the next comet be visible

Rhiannon: There are comets visible every night... though most require a telescope to be seen. The next big meteor showers are the Eta Aquarids, which is pretty cool as they are dust from Halley's comet. You can see them on May 5-6, however there will be a full moon that night so the normal 10-30 meteor per hour will be a much lower rate. Not as impressive. But look out for the Perseids this year in August! We are expecting them to give a nice show. ☺

HoustonFranze: Which part of the sky is it best for viewing this incredible event from Houston Texas?

Bill: Lie on your back and look straight up.

Doctor: where can i see the meteors on the webcam, it looks like clouds.

Bill: Hopefully, the clouds will clear later.

Serapis: I hope you all have a good night and good luck seeing them! Off to bed.

Rhiannon: Thank you for joining us!!

Vicki: Just saw the second one, there is a lot of cloud cover here. but if your eyes are set to one place you'll often notice a faint streak of line

Danielle: Great! Glad you are having some luck through the holes in the clouds!

Ktradley: if the peak time is 12:30, will that be for a certain time zone, or is 12:30 for everyone's time zone

Bill: It's everyone's local time.

Arire: If I am in Northern California (Humboldt) will it be to the north east?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Lie on your back and look straight up.

Turnerkj: I have a little girl who is 12 years old and wants to join some kind of space program for kids. Do you offer one. She is very, very serious about a career in space exploration, especially using telescopes and research?

Bill: How about Space Camp?

Vicki; How fast are the meteors moving in space, before they get taken in by Earth's Gravity?

Bill: In the case of the Lyrids, approximately 110 thousand miles per hour.

Ktradley; being somewhat cold here, will we have a chance to see some looking outside a window that is mostly clear of trees or buildings/

Bill: No, not if you have the lights on inside the room.

Missyleigh: @Brooke I've seen 4 here in Columbus, MS. Over about a 30 min period.

Bill: Great! Glad you are seeing meteors.

George: Can i see the Lyrids im Mexico??

Bill: Yes.

Turnerkj: Bill: Where would I research space camps?

Bill: <http://ussrc.com>

Vicki: These are debris left from a comet that occurs every 450 or so years, how come we see the debris every year?

Bill: Because the debris has spread out over the orbit so that there's always some to run into.

Berlin\_Pennsylvania: they are very abundant on the iss feed i have seen 3 already

Bill: You are probably seeing lightning or cosmic ray hits on the cameras. We haven't see any meteors on the ISS feed as of yet.

Raincloud: I just read that Danielle "analyzes lunar meteoroid impact data." Is the moon taking a beating from this shower?

Danielle: The Lyrids can impact the moon too --in 2007 we observed 13 or 14 Lyrid meteoroid impact flashes on the moon. During the Lyrid peak this year the moon phase is new so we aren't observing the moon for impact flashes.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Arjun: the iss livestream isnt working it looks like colorful static

Bill: It is working, but you are seeing the dark side of Earth. The static is due to cosmic rays and noise caused by passage over the South Atlantic anomaly.

Fkhan: the ustream video looks grey; is that normal or do I need to change any settings?

Bill: It is gray because of clouds, so do not change your settings.

grower1331: i see alot of activity on the iss feed. are all those meteors?

Bill: Cosmic ray hits and interference from the SAA. No meteors so far.

Vicki: What if you can't tell the difference between the little dipper and all the other stars? and also CTV's showing a late night movie; planet of the apes

Rhiannon: The iPhone and iPad have great apps to show you different constellations. Enjoy the movie!

HoustonFranze: My sky is clear, just want to know I am getting the best possible viewing area with the naked eye :)

Danielle: I'm very jealous of your clear skies! The best view is from a dark, safe place -- just lay on your back and look up! No special equipment needed.

Turnerkj; Bill: Thank you! Is there a place where we can make a donation to keep things, like you are doing tonight available for our children?

Bill: You're already donating your tax dollars. Thank you!

Cris; which side will you be able to see the meteor shower at?

Bill: Look straight up.

JA: So when it starts, then the livestream will show properly?

Bill: Only if the clouds go away.

SEAFlyER777: What is the best time to observe the shower in Seattle?

Rhiannon: Midnight to 6 AM local time is your best bet.

threads : do the meteors during these showers impact earth? and if so do many of them get recovered?

Bill: They burn up in the atmosphere about fifty miles above your head. No Lyrid will reach the ground.

Luna: The sky is cloud? Can we see something?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: The clouds are trying to break around here! We are hoping it clears up in the next couple hours.

Fkhan: I am in central time zone, will this be a good time to go outside to observe?

Bill: Yes.

Fgdgh: How did you guys end up getting jobs at NASA?

Rhiannon: We all have our own stories. Personally, I was born in Canada and have spent most of my life there. However in 2000 my parents moved to Chicago and we started the process of becoming US citizens. I became an American in April 2010. Bill Cooke funded my master's work up in Canada (working with a meteor radar), so I had gotten to know him a bit and he was able to offer me a job in September of 2010. I love working at NASA! I feel like it is a privilege to be a part of this organization. ☺

*Moderator Brooke:* That's the Soyuz capsule on the ISS feed!

[http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Vicki: Whats the website to the ISS's live feed>

Danielle: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Ktradley: can people in south america see the shower tonight, or is it only northern hemisphere?

Bill: Yes, people in South America can see Lyrids.

Honkeyman; how high up in the atmosphere is the balloon supposed to go before it pops?

Bill: Between 100,000 and 120,000 feet.

Raincloud: Someone posted they saw a metoer or two through the clouds. I have clouds too :( If I can't even see stars, is there still a chance I could catch a meteor? Or should I just keep hoping these clouds move?

Rhiannon: If you can't see stars it is unlikely you will see meteors. However we have seen some very bright meteors through the clouds in the past.

Chava; i live in indiana and i wan tto see the lyrid shower, when is a good time to go out side?

Bill: Midnight to dawn local time.

Cris: i don't see anything yet outside my house and its really clear

Danielle: Are you inside with the lights on? You need to be outside for 30-45 minutes for your eyes to adjust to the dark. The other thing -- meteor observing requires a lot of patience... and coffee. ☺

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Fkhan: If the debris has spread around the orbit over the years then how do we know that these meteors are from thatcher?

Bill: Good question. The orbits are similar enough to that of the parent comet that we know they came from Thatcher, as their orbits can be reproduced with only a modest ejection speed of ten to fifteen meters per second from the comet's surface.

Vicki: Since there's about 15-20 meteors per hour, what are the chances of there being 2 maybe even 3 meteors at once in a single field of view?

Bill: Pretty small, but not impossible.

Honkeyman: where was the balloon launched from?

Bill: It will be launched from Bishop, California.

Raystram: No rain clouds tonight in the Seattle area. It should be good viewing

Bill: Congrats! Wish it was clear here.

Chava: when does this shower begin!?

Rhiannon: Now! Though the best time to view it is midnight to 6 a.m. local time.

JA: Do you know the best time to observe it in the Caribbean?

Rhiannon: Midnight to 6 a.m. local time. We hope you have clear skies!

Raincloud: Are meteors dangerous to man-made satellites?

Bill: Meteors and man-made space junk are the greatest risks to satellites once they reach orbit.

Tchaho: Will there be a time in the future where all this debris is gone, out in space somewhere else, and it won't be visible from Earth?

Bill: After Comet Thatcher ceases to be active, it will produce little or no debris and the stream will disperse over many thousands of years.

myeyes41: I am near Lake MI near Frankfort. When should I be able to view the shower? We are clear but I have yet to see anything other than still stars/planets.

Bill: Midnight to dawn local time.

*Moderator Brooke:* The ISS cam is looking down at clouds over Earth -- nice view!

[http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.htm](http://www.nasa.gov/multimedia/nasatv/iss_ustream.htm)

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Arjun: the iss stream now shows a sattelite or something like that

Bill: That the Soyuz capsule used to ferry astronauts back and forth to the Station.

CassyMarie: Do the Midnight to Dawn times apply to south Texas too?

Bill: Yes.

Rhiannon: You can see part of the ISS in the feed again. How cool is it that we are able to see a camera live, looking for meteors, located 400 km above Earth? I love technology! And space!

Imsirius: It is not clear here in the Northeast, But I have seen an increase in metiors latley. Is this accurate or just wishful thinking on my part? ;)

Bill: There are more bright meteors seen in the spring than in the other times of the year.

Sad\_For\_Rain: Why do meteorites appear to come from a radiant?

Bill: Because they are moving in roughly parallel directions. If you think of a railroad track and look at it down the track, the rails will appear to converge at the horizon. That's why meteors appear to come from a radiant in the sky.

Sillywink: i just see grey what am i doing wrong?

Bill: Nothing. It's cloudy.

Mouseki; Clear skies here near Seattle - but light pollution is a factor. Any meteors likely to be bright enough to see despite it?

Rhiannon: If you are able to see even the brightest stars there is a chance you can see Lyrids. However the darker the skies, the more you will see.

Cris; i can't see any meteor showers right now in katy texas and its clear, do i have to wait till 12 am its 11:32 pm

Bill: You need to be patient. You may see a Lyrid every five to ten minutes or so. If you are not paying attention, you will not see that many.

Fkhan: Is earth's speed around the sun and it's own axis included in the calculations for speed of these meteors when they hit our atmosphere?

Bill: Yes.

Vicki: How far up is the ISS located, and does it move with the 24-hours rotation of the Earth, or against it?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: The ISS is about 400 km up. It travels around the Earth every 92 minutes.

Can: Where can I find a live view of the shower?

Rhiannon: The feed is located above the chat box on this page. A view from the ISS is located: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Calebfoster: How is it? Can't see it from here.

Rhiannon: The International Meteor Organization is reporting good rates! Check out [www.imo.net](http://www.imo.net) for a graph of results from observers around the world.

Luna: Will visible anywhere on the planet? Or only in the northern hemisphere?

Bill: Anywhere north of Antarctica.

Jessica: When do you think they'll be seen in Rio Rancho, near the suburbs?

Danielle: Is that Rio Rancho, New Mexico? The Lyrids are expected to peak around 5:30 UTC -- that's 11:30 pm your time I believe. Is Rio Rancho a big city? You'll want to get far away from city lights.

Ktradley; is the ISS live stream showing a still image right now? or is that an acutall sunset live video

Rhiannon: It is currently a still image.

Raincloud: It was mentioned the amount of meteors we encounter can vary to how many are in Earth's path. When a comet passes us again, do we encounter more meteors that are newly left behind from the comet?

Bill: Newly deposited trails are generally denser. The older the trail, the more spread out, unless a planet's gravity (like Jupiter) focuses the stream.

*Moderator Brooke:* Remember, if you know of good live allsky camera links, send them to us at [cd70web@msfc.nasa.gov](mailto:cd70web@msfc.nasa.gov), and we'll add them to our allsky camera page: <http://www.nasa.gov/connect/chat/allsky.html>

Rosemary: I have a question but not about the shower I live south ofseattle washing

Danielle: What is your question?

Ktradley: how long will the showers happen? Does this happen durring the day as well even though we cannot see it durring the day?

Bill: It will last a few days (2-3) and, yes, it does happen during the day, but you can only see the meteors at night, when the sky is dark.



**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Berlin\_Pennsylvania: why does the iss feed show still pictures?

Bill: Because there is currently a loss of signal in the video feed.

Ktradley: have there been any reported hits from the showers in space? any sats or other things in space

Bill: The Olympus satellite was taken out of action by a Perseid in 1993. Mariner 4 was hit by several meteors midway between Earth and Mars in 1967.

Jessica: It's mostly a suburb, but there's some lights, even though they're dim. Will I still be able to see the meteors properly?

Bill: Depending on how bright the lights are, you may see Lyrids, at least the brighter ones.

Imsirius: How many of these meteors will make it to the earth surface and become meteorites?

Rhiannon: There will be no Lyrids that make it to the ground. They all burn up by 70 km up. Less than a tenth of a percent of total (shower+background) meteors make it to the ground to become meteorites.

Vicki: What is Radiant?

Danielle: Meteor showers are named after their radiant -- or the point in the sky from which the meteors APPEAR to originate. More specifically, a shower is named for the constellation nearest to that point in the sky. So the Lyrids are named for the constellation Lyra. And the Leonids are named after the constellation Leo. And so on.

Berlin\_Pennsylvania: Does this loss of signal happen often?

Bill: With the video feed, yes, it is a regular occurrence. There is no loss of signal for vital data coming down from the ISS. Video is not considered vital.

JessyMatar: how do we choose the perfect place for watching meteors ?

Bill: A dark sky with few trees would be good.

Byff: Can we expect to see anything in the northeast tonight/this morning what with the crummy weather?

Rhiannon: If your skies are clouded out, you will not be able to see Lyrids yourself. Though keep your eyes on the feed. We are really hoping it clears here within a couple hours.

Geeti: how big are the meteors? and how far are they from our earth?

Bill: About 0.1 to 1 millimeter. They are burning up about fifty miles above your head.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Arjun: i wish the clouds would move away, ive been waiting since beginning january to see this

Bill: We wish they would go away, too.

Moebailey: when will the iss feed be back, it's a still picture right now

Rhiannon: We do not know the answer to that... hopefully sooner than later. LOS = loss of signal.

Grail: When are the Lyrids expected to peak in Ely, Nevada?

Rhiannon: You will see most meteors between midnight and 6 a.m. local time, if you have clear skies. Happy viewing! We hope you get to see many. ☺

Ktradley: how do we know this is from a comet that passed several years ago?

Bill: Because the orbits are a close match to that of the comet.

JessyMatar: when is the best time to watch meteors? is it just before dawn or much before?

Danielle: Generally, with sporadic (aka background) meteors, it's best to watch in the hours just before dawn. The Lyrid meteors are best seen between midnight and 3 a.m. local time on the 22nd from North America, as they traditionally have peaked at that time.

Sad\_For\_Rain: So if the earth goes through different filaments of debris, why does it always appear to come from the same point of the sky each year?

Bill: The filaments do come from slightly different directions, but the difference is so slight, it would be hard to notice with your eye.

*Moderator Brooke:* The ISS live Ustream feed is back!

[http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

DavenJen: Are there multiple video camera sights or just one?

Bill: If you are referring to the cloudy Ustream feed, just one camera.

ThinkVegas: After the Lyrid event, what is the next best meteor shower event of the year? And will you be doing this live chat again at that time?

Rhiannon: The Eta Aquariids peak May 5-6, and are pretty neat as they are pieces of Comet Halley. However it will be a full moon during that time and thus the viewing will be significantly hampered because of that. The Perseids in August should be great this year if you have clear skies. We plan on doing a chat during that event again.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

rania.shehab.89: i wanna know if i'm going to be able to see here from hoffman estates illinois , it's really cloudy so far !

Danielle: Hi there! I'm originally from Illinois myself! Unfortunately, if it's cloudy you won't be able to see any meteors. It's possible to see meteors through breaks in the cloud, however. And if it clears up entirely for you, you should be able to see them from your location if its dark and clear enough.

Chloe: How are the actual locations of the radiants determined?

Bill: The radiants are determined by taking all of the observed meteor trajectories and tracing them back to see which ones intersect at a common point.

Vicki: Do the birghtness of the "shooting star" depend on how big it is?

Bill: Yes, the bigger the brighter.

Rhiannon: The ISS feed is back working. [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Raincloud: It's been lovely chatting but I'm out of here for now. I looked up weather maps and hope my Eastern PA sky is clear in a couple of hours so I can take a look. Huntsville is looking pretty cloudy for a good while, I wish yall the best of luck!! Let's hope the winds blow these clouds away quicker!

Bill: Thanks!

JessyMatar: why do we call it lyrid meteor shower?? lyrid refers to what

Danielle: The Lyrids are named for their radiant (the point in the sky the meteors appear to be coming from). The Lyrid radiant is in the constellation Lyra, hence its name. Other showers are named the same way -- the Leonid radiant is in the constellation Leo, the Geminid radiant is in the constellation Gemini, etc.

ELPALLSKY: Hi Brooke, Hi Bill...Clear skies here, just no meteors yet.

Bill: Hi, Jim, cloudy skies here.

Trey\_Anastasio: Bill: Can you tell us more about the Aquarid meteor shower from Halley's Comet happening on May 6th?

Bill: The Eta Aquariids are one of two meteor showers caused by Comet Halley (the other is the Orionids, which occur in October). Eta Aquariids are fast meteors moving at about sixty-six kilometers per second, which is almost twenty kilometers per second faster than the Lyrids.

Mouseki: We may only see clouds but they're pretty fascinating to watch :) Do other meteor showers have meteors that make it to the ground?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Danielle: Clouds can indeed be mesmerizing. ☺ The general school of thought is that meteor showers don't produce meteorites. This is because their composition is so light and fluffy that all of the meteoroid material ablates, or burns up, in the atmosphere before it can reach the ground.

JessyMatar: can a meteor shower enter our atmospheric layer?

Rhiannon: Meteor is the phenomenon of a piece of dust/ice that has entered our atmosphere and is burning up.

Ktradley: will we be able to see the ISS fly over as well as the showers

Rhiannon: You can see the ISS flying over the Earth here:  
[http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Mouseki: What will the meteors look like from the ISS?

Bill: Go to <http://www.facebook.com/nasameteorwatch> and look at the top picture which shows a Perseid photographed from the ISS.

JessyMatar: can i say meteors on my stellarium?? cz the sun rised here in lebanon..

Danielle: I know I can "turn on" meteors in my version of Stellarium. But these are simulated streaks of light on the screen, not real meteors.

Sad\_For\_Rain: What is the chemical composition of lyrid meteors?

Bill: Ice-dust mix.

Dona: Hi, all , what is the best time for veracruz mexico (gulf of mexico)?

Danielle: The Lyrids are expected to peak around 5:30 UTC. That's 1:30 Eastern time or 12:30 Central time. So the best time to watch is from now until around 3 a.m. local time or so.

Chloe: How much of a risk do the meteors pose to the ISS and other satellites?

Bill: Depends on the size of the satellite. The ISS is heavily armored so the risk from meteoroids is small. The risk to unmanned spacecraft would be greater, however they are smaller than Space Station and this reduces the chances of them being hit.

Vicki: I was just wondering, has the ISS ever been hit by meteors, and if you're up in space im guessing you have to change your path according to where the meteors will be passing from?

Rhiannon: The ISS is often hit by meteors, but it has armor and is very well-protected so there has never been severe damage from them. During meteor shower outbursts, or meteor storms, some satellites may change their attitude so that their more sensitive equipment is facing earth.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Jeremy22: About how fast are meteors going when they hit the atmosphere?

Bill: In the case of the Lyrids, between 103,000 and 105,000 miles per hour.

Arjun: on the iss stream the earth is turning fast. is this how fast the earth is turning or is this how fast the iss orbits earth?

Bill: This is how fast the ISS orbits the Earth. It goes around once every ninety minutes or so.

Madditexas: Clear skies here in Texas! I was just wondering, is there any particular direction we should be facing? North, South, East or West?

Bill: Lie on your back and look straight up.

Imsirius: Have records been kept about the frequency of the sightings of the meteors? How many are normally seen each year just from the lyrids?

Rhiannon: Yes. Meteor showers are now well-observed and recorded. [www.imo.net](http://www.imo.net) is a good resource for that. They have live graphs of the activity of meteor showers, as well as other helpful information on meteor showers.

Byff: What's the chemical composition of the dust in the meteor (generally speaking, if we have any idea)?

Bill: Have no idea. Bulk density is around 1 gram per cubic centimeter.

Calebfooster: do they contain organic compounds?

Danielle: Some types of meteorites contain small amounts of organic matter.

*Moderator Brooke:* ISS cam just panned for the next pass over Earth -- they have a beautiful view there above the clouds: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Chloe: Will the video from the student balloon be available at some point?

Bill: We hope to post snippets on the Facebook page: <http://facebook.com/nasameteorwatch>

Jeremy22: How far into the atmosphere do meteors usually get before they're completely burned up?

Bill: In the case of Lyrids, fifty miles altitude.

Ktradley: how high up is the iss

Bill: About 400 kilometers.

Froggy; where should we be looking in relation to vega?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Ignore Vega. Lie on your back and look straight up. If you look at Vega, you will not see many Lyrids, because you are looking too close to the radiant.

Vicki: My dad's is currently way up North, the north part of North West Territories, Canada, he told me he can see the northern lights, but he can't see any meteor. can they possibly be blocked out by the northern lights? He's on a special expedition so he's in an area that is free of buildings and trees?

Rhiannon: The northern lights should not block out the meteors. Perhaps he has just not seen any Lyrids yet. I hope he does! Let us know if you hear from him. ☺

Berlin\_Pennsylvania: how does the angle on the iss compare to the angle on from earth?

Bill: I don't understand the question.

Lelan: I live in Fairbanks Alaska where is the best place to see a meteor shower and what time?

Bill: Midnight to dawn local time. Find a place with a dark sky and few trees around.

Ktradley; what causes the ISS to orbit the earth? does it have some kind of system that propels it forward or does it use the earth's gravitational force?

Bill: Just the Earth's gravity.

Shrooki: Clear skies in Houston! Thanks for this chat service NASA!

Danielle: Awesome!!!!!! Hope you are treated to some Lyrids!!!

captcdm501: So, I should just generally look up, and I should see bright spots in the atmosphere sporadically?

Bill: Streaks, not spots.

Geeti: if the iss orbits the earth in 90 minutes, will we be able to see the lyrid shower from the iss camera?

Rhiannon: That is what we are hoping to see - Lyrids from the ISS. ☺ You will notice that the live-feed from the ISS will get darker in a while. That will be because the ISS has gone into sunset. It orbits every 92 minutes and has a sunset/sunrise each time!

Chas: how big are the average pieces?

Danielle: They are millimeter to centimeter sized particles that create long streaks of light as they burn up in the atmosphere.

Txhunter: Is it best to just look up or more towards the horizon?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Lie on your back and look straight up.

THESEEKER: I wish we had a live scroll under the USTREAM video to tell us what to look for.

Rhiannon: Unfortunately the USTREAM is still clouded out here in Huntsville. Weather satellites are telling us that it may clear up in an hour or two. We are hoping this is true!!

Fkhan: does earth capture any water from meteors? If yes, how much approx?

Bill: It is thought that comet impacts may have delivered water to the Earth in the distant past. In the case of meteors, the water is vaporized as the meteor burns up high above the surface.

Berlin\_Pennsylvania; what is the difference between the view from the iss and from the view from the earth? Do the meteors travel in different directions according to each angle

Bill: On Earth, you look up to see meteors; on ISS, you look down. Can't be more specific than that.

Ktradley: seems to be a lot of clouds.. both on the live stream above, and the ISS looking down at earth.. not being very cooperative tonight

Bill: Yeah, the weather sucks in the Eastern USA.

Vicki; Just heard back from my dad, his expedition team just saw 6 meteors in the past 40 minutes

Rhiannon: Fantastic! So glad for them! (and a bit jealous 😊 ) Thanks for letting us know.

Mouseki; Oh the ISS feed looks like it's getting pink - sunset?

Bill: Quite possibly.

Bread: for some reason im not even getting the live stream

Rhiannon: Perhaps you need the latest version of Java? Or perhaps you can try a different browser? We have had those problems as well in the past.

Berlin\_Pennsylvania; if it takes aprox. 8 minutes for the suns light to reach earth how long does it take to get to the iss aprox.

Bill: Same amount of time, because the ISS is in orbit around the Earth.

Bread: hey im in ga and it is raining where i live will i still be able to see the shower ?

Bill: Nope. Rain and meteors don't get along --- you need clear skies.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Ktradley: its clear here in memphis, waiting till 12:30 here to start looking out my window.. its in the 40's here.. not going outside tonight. i have a windows facing east and i can see over 70% of the sky.. going to try my luck there in about 20 min

Rhiannon: We hope you see some too... let us know if you have any success looking out the window.

Ktradley: i got to use my 200mw green laser tonight.. i was amazing.. i got to point out saturn and mars

Rhiannon: Fun!

Katthing: How do I even know I am looking in the right area? We had GPS locating it. But I hope ot got my diredtion correct

Rhiannon: To see the Lyrids you just want to lie on your back outside and take in as much of the sky as possible. Let your eyes adjust to the dark (takes 30-40 minutes), and enjoy! We hope you see lots of meteors!

Xlmmortal: The ISS looks like it is moving at a pretty good clip. Looks like it is going faster then what I remember

Bill: The ISS orbits Earth about 8 kilometers per second. That hasn't changed.

Grimes: ugh, just stood outside for like 3 hours, saw nothing :(

Bill: Sorry.

Jeremy22: The planet looks slightly curved in the view from the ISS Ustream. IS this the actual curvature of the planet or just an opitcal illusion from the camera?

Bill: Yes, it is the actual curvature of the Earth.

Berlin\_Pennsylvania: since the sun is on one side of the earth when will they see the meteors or did they see them already where it is sunlit

Bill: Hey, saw them already.

Imsirius: When a meteor burns up in the atmosphere does the remaining ash still continue to earth? Or is there nothing at all left?

Bill: Nothing at all left.

Spaceiscool: Are you guys having fun answering questions?

Bill: Yes, we are.



**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

*Moderator Brooke:* We're cautiously optimistic -- it looks like some of the clouds are thinning on our Ustream feed from the allsky camera here in Huntsville. And speaking of cameras, night is falling on the ISS cam... [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Wray: The kids just saw one. :)

Danielle: Great!!!!

Grimes: do you guys have an estimate on when(if it even will) hit the 100 per hour mark?

Bill: The Lyrids are very unpredictable. The last time they hit 100 per hour was in 1982, so it is highly unlikely, but not impossible that will happen tonight.

Chloe: How do you numerically label the radiant? Is it measured in reference to something in particular?

Bill: The coordinates of the radiant are given in right ascension and declination which are similar to latitude and longitude on the Earth.

Vicki: What do the meteors look like from the ISS cam?

Rhiannon: Check out the cover picture of [www.facebook.com/NasaMeteorWatch](http://www.facebook.com/NasaMeteorWatch)

Vegatarian: The Lyrids are debris from a particular comet correct? If so, which comet is it?

Bill: Comet Thatcher.

Berlin\_Pennsylvania: where you guys based?

Rhiannon: Marshall Space Flight Center in Huntsville, Alabama! (Rocket City, USA ☺)

Hasaby: Will they quickly go by on the screen in a blink of an eye?

Bill: In a second or so, yes.

Berlin\_Pennsylvania: are you guys watching all of the current feeds

Bill: We are watching the Station and Huntsville feeds.

LTN: Hello all ....it's super cloudy here in FL but I am hoping since the clouds are thinning out we should still get an good show....nothing so far but I heard it should really begin around 1:30am is this true?

Bill: The shower peaks around 1:30 a.m. Mountain time, but you should be able to see Lyrids between midnight and dawn.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Moineau: i copied the address you gave for the iss cam... not the right address... copied exactly, twice (page not found). can you repeat it, please?

Rhiannon: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html) Hopefully this will work for you! Let us know.

Jeremy22: How does the Earth run into the same stream of debris at the same time every year? Shouldn't the different orbits of the Earth and the comet cause the shower to happen during different times from year to year?

Bill: The Earth and the comet move in the same orbits, so the point of closest approach doesn't change.

Xlmmortal: Does the static coming from the ISS feed and occasional mic bump, come from the ISS, Houston, or is that just a part of the radio transmission?

Bill: The static is partly caused by cosmic rays and interference within the cameras.

Txhunter: clear skies, only bats so far here in Arlington

Danielle: Nice!

Berlin\_Pennsylvania: If they are dots with small tails is that considered a meteor

Bill: Meteors appear to be streaks in the night sky. They last for just a couple of seconds.

Dono: central texas and perfectly clear night.

Danielle: We're clouded over here in Huntsville, AL, so I am very jealous!

Vicki: Has there ever been a meteor big enough that it didn't burn up at 50 miles up, but instead burned up at like 2-9 miles? maybe even hit a plane?

Bill: Meteors can make it to the ground as meteorites, but this is fairly rare. And to my knowledge, no meteor has ever struck a plane. Houses, yes. Cars, yes. Dogs, yes. Planes, no.

*Moderator Brooke:* Y'all are awfully quiet for a room with 150 people. ☺ If you have any meteor questions or observations to report, this is a great time to ask.

Vicki: What formula did you use to calculate how fast the meteors travel at? taking into fact how fast the Earth is traveling at?

Rhiannon: At the Meteoroid Environment Office, we can calculate the speed of meteors using all-sky cameras. If the same meteor is seen in multiple cameras, one can use triangulation to calculate its speed (using background stars for reference). It is essentially a distance over time calculation.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Delacruz: at what time would the lyrids be here in alberta canada. MST 11:21PM right now.

Bill: Midnight to dawn local time.

Grimes: how many meteors should we be expecting at the peak around 3:30am EST?

Rhiannon: If you have clear skies, you can expect between 10-20 per hour. Though the International Meteor Organization ([www.imo.net](http://www.imo.net)) was reporting more than that already tonight!

Dana; Witnessed one trail here in Missouri around 11:30CST, some clouds moving overhead, hopefully will clear soon

Rhiannon: Awesome! So glad you got to see one.

Moineau: sorry no luck with the iss cam address... copy and pasted it and it says "page not found" (was moved etc...)

Danielle: This works for me. Make sure you don't have any extra spaces or characters when you copy and paste. [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Georg: Is safety watch directly to de meteor? or can affect our eyes?

Bill: Yes, it is safe to watch meteors. It cannot affect your eyes.

Jeremy22: I wish there were as many meteors as there are mosquitoes tonight!

Danielle: LOL! 😊

Vohpoh: Hrmmm well, can you tell me what sort of material these meteors are made of?

Bill: Ice-dust mix.

Vegatarian: Are there any good schematics online that show Thatcher's and Earth's respective orbits around the Sun to better visualize how they link up?

Bill: Go to <http://ssd.jpl.nasa.gov/?horizons> and use their visualization tool.

Michelle73: Can you tell me what direction to look in the sky to see the show?

Rhiannon: Your best bet is to lie on your back outside, look up, and take in as much sky as possible. Let your eyes dark adjust (takes 30-40 minutes) and enjoy!

Berlin\_Pennsylvania: at what speed on average are these meteors traveling t

Danielle: Lyrids travel, on average, 110,000 mph. That's about 50 times faster than a speeding bullet! (To be clear, that's about 50 times faster than the muzzle velocity of a 50 caliber sniper rifle.)

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Vicki: The ISS feed i think just blacked out, u can't see part of the ISS its just streaks of static lines

Rhiannon: It has not blacked out, it has just gone into sunset. Be looking for streaks of light ...meteors!  
You may see some lighting or cosmic rays as well.

Aaron: Is it possible to see the lyrids through the 25th?

Bill: We have not seen bright Lyrids on our cameras past the night of the 23rd.

cc4525: san angelo tx clear skies..

Rhiannon: Awesome! We hope you see many Lyrids!

StarFire: Dont know if anyone's asked this already.. but when's the video footage going to show something?

Rhiannon: The camera streaming on this page is clouded out. According to weather radar, it will possibly clear up in the next hour or two.

Katthing: How do i know i am in the correct area of my house to be looking at this? I have a huge yard. however, its cold so i am wandering about trying to find where i need to br

Bill: You need to be outside. Sorry that it's cold.

chris\_todd: Hi!Here at the Texas Star Party, with a CanonT2i and 10mm fisheye centered roughly on Arcturus, hoping for some bolides.

Bill: Good luck!

XImmortal: Is it possible for you to estimate where the thickest part of the dust trail will be?

Danielle: With simulation and modeling techniques we can try to predict where the stream of meteoroid particles may clump over time. But this sort of thing needs to be backed up with observations.

Threads: time for me to go fire up the chimnia, snuggle up close to it in a lawn chair and see how many i can see,,,,, hope everyone has a good viewing tonight

Bill: Hope you see some Lyrids.

Maria: Raining cats and dogs in Tampa...

Rhiannon: ☹ So sorry! We are hoping to have clear skies here in a bit! Maybe you can see Lyrids on our live stream later tonight...

Hasaby: when will i see the meteor shower in vancouver ?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: The best time to view is between midnight and 6 a.m. local time. Hoping for clear skies for you!

Bread: I am still not able to pull up the ustream. I've tried downloading the java and ustream app

Danielle: It gives you an error? Or the screen appears black? Our Ustream feed is gray right now because it's cloudy. And the ISS feed is black.

Grimes: Can you see these lyrids from anywhere in the world? Where should I be looking to see the lyrids? Any constellations or noticeable parts of the sky?

Bill: Anywhere north of Antarctica.

jwt\_kottekoe: Beautiful, clear, warm evening in the San Francisco Bay Area. I was out for about 15 minutes and saw a single Lyrid lying on my back in my driveway in the middle of Saratoga, CA. It was bright and brief and worth every penny.

Rhiannon: Fantastic!! We love getting good reports like that!

*Moderator Brooke:* If your skies are overcast, visit the MEO group's new Facebook page at <http://www.facebook.com/NasaMeteorWatch>. You can see some Lyrids images and videos from the last few nights before the clouds decided to crash the party!

Vicki: Do the meteors join up together to form bigger meteors?

Rhiannon: No. The meteors burn up in the atmosphere very quickly. The Lyrids travel 110,000 miles per hour.

Janet\_C: Have seen quite a few here in Dilley, Tx

Rhiannon: Great! We are so glad for you. ☺

Jeremy22: Does the Moon get hit with the same meteor showers as the Earth?

Danielle: Yes, though sometimes a little before or a little after Earth experiences the shower. At NASA Marshall Space Flight Center we have a program to monitor the moon for lunar impact flashes caused by meteoroids striking the moon's surface. We've observed flashes during several meteor showers, the most (a dozen or more per shower!!) were seen during the Geminids in 2006 and 2010, the Lyrids in 2007, and the Taurids in 2008.

Bread: it's a black screen and it's got the loading circle spinning

Danielle: Sorry, I'm not sure what the problem is. ☹ I feel bad that you are missing out on the videos.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

LTN: So, would it be safe to assume since I am on eastern standard time that I can relax on my couch for a bit until approx 3:30pm (my time) and then go back out and lay outside in our yard to see the shower :)

Rhiannon: If you know you will have clear skies then, absolutely! Take a rest and then go out and enjoy meteors. We hope you see lots. ☺

Vicki: Theres little flashes, in the ISS cam feed is that the meteors or just lightning?

Rhiannon: We cannot confirm that any of those flashes are meteors yet. They may be lighting or cosmic rays or other phenomenon.

Katthing: i am outside....laptop cell phone binoculars all bundled up outside. just want to make sure im looking out corredt side.

Rhiannon: Awesome! We would recommend not using the binoculars. You want to be able to see as much sky as possible. Just lie on your back, look straight up, and let your eyes adjust to the dark. We hope you see many meteors!

Yumiriea: Oh wow i think i might have saw another one . . . and another one and another one and another one....oh wow ..

Rhiannon: Fantastic!

Geeti: I am watching the iss feed from New Delhi! You guys at nasa are awesome! though no lyrids so far :(

Danielle: I went to New Delhi a couple of years ago in June. It was VERY hot! ☺ Thanks for joining us online. If we see any Lyrids in our all sky cameras they will be posted to the site:

<http://fireballs.ndc.nasa.gov/>

Jetstone: not sure what my chances are of seeing some in Denver, Co but my guess is that they are next to minimal

Rhiannon: If you can get out of the city lights that would be best. Though if you can see any stars you have a chance of seeing meteors.

JoshCryer: Fog rolled in here in Monterey County, won't be seeing any most likely :(

Rhiannon: So sorry! We are hoping our skies clear soon so you can see meteors on the live stream.

Yumiriea: o.o whats up with the iss cam, is this a still shot ? ?

Rhiannon: Currently the ISS is going through 'night', it has passed sunset. Look for meteors!

Wray: We've seen a few here in Arkansas. Skys are very clear tonight here.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Congrats!

Vohpoh: Is there any sort of radar that could be used to detect the density or size of the meteors, or does the number of/makeup of them make that impossible?

Danielle: There are several meteor radars in operation. The Canadian Meteor Orbit Radar in Ontario, Canada is one example. High Power Large Aperture radars (HPLA) in Kwajalein, and Arecibo, Puerto Rico also detect or have detected meteors. And there are others elsewhere in the world. The speeds, trajectories, and orbits of the particles are the easiest to calculate. A lot of work goes into calculating the size/density.

Doug: Where is **\*\*Saturn\*\*** located in the sky right now?

Rhiannon: Saturn is in the east/southeast of the sky for us in Huntsville right now.

XImmortal: Does this shower pose any safety concern for our hero's on the ISS? Or they are totally safe, or as safe as you can be in space floating around all that debris?

Bill: No. The Space Station is armored.

Jeremy22: I'm seeing tiny orange specks of light flash on the ISS stream. Are these meteors?

Bill: No.

Kirls: I saw one in Arizona about 30 minutes ago. lasted for more than a second too.

Bill: Congrats!

Captain\_Typho: Going out in an hour or two here in West Texas. Is there any specific area in the night sky that may see more activity than others?

Bill: Lie on your back and look straight up.

Imsirius: I have been seeing flashes on the ISS feed,.. are these meteors?

Bill: No, cosmic ray hits on the camera.

Yumiriea: When is the best time to see them in New Mexico, by the way i think i just saw one on the iss!!!

Danielle: The Lyrids are expected to peak right now! But you should also see activity throughout the night.

chris\_todd: Just saw a nice lyrid bolide that went from roughly vega to polaris

Bill: Congrats!

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

BP: ??? Bill Where do I look???? Been outside 20 mins in North Fort Worth, Texas and have seen zero.....

Bill: Look straight up. Remember it takes thirty to forty minutes for your eyes to dark-adapt.

Chava: where in the sky do i look for the meteors?

Bill: Look straight up.

BP: I live near Forth Worth, Texas and been standing outside looking. where do I look? I have seen Zero.....

Bill: Look straight up. Do you have dark skies?

Exmedic: It's a great night for viewing in southern Illinois. I've seen SEVERAL, just had to come in and thaw out a bit, LOL

Rhiannon: Fantastic! So glad you got to see some. ☺ And it is a chilly night here in Alabama, too!

Berlin\_Pennsylvania: are there people designated to each feed or do you all just stare at the same two feeds

Bill: We all stare at the same two feeds.

Ktradley: i was just looking out my window for the past 30 min.. i saw one for sure, maybe 2. second one wasnt as bright as first, but it seemed like a flash of light going from one part of the sky to another

Bill: Congrats.

Vicki: theres little blue,red,green, and white streaks of lines lasting less thana second on the ISS live cam

Rhiannon: That could be lightning, cosmic rays, trapped protons, meteors, or other events! We cannot confirm any at this point.

BP: IT is North East.. correct? Above the horizon?

Danielle: From Fort Worth, TX the Lyrid radiant is above the horizon in the north/northeast right now. But you shouldn't be looking in that direction. You should just look straight overhead.

Vicki: Rephrasing my previous question, do the particles left behind by the comet join together in space to for bigger clumps of particles?

Bill: Only if the gravity of a planet like Jupiter focuses them, which is rare.

Orangeeye: seems cloudy here. where is everyone getting a good look from. My city has too much city bright....big city



**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: City lights definitely hamper meteor viewing. If you can get outside of the city a bit your skies will be significantly darker!

toocloudy2Clyrids; What are all of these colorful streaks I see on the ISS cam. I see green, blue, white, orange, red... It looks like a laser show lol

Bill: Interference caused by the South Atlantic Anomaly.

Grimes: I live in Lawrenceburg, Indiana. We have dark and clear skies, sat outside for 3 hours and saw none :( Where am I supposed to look?

Bill: Straight up.

Vicki: How well armoured is the ISS, like in mm (using military terms)?

Rhiannon: It is armored with a 'stuffed bumper shield' and can stop a 1 inch particle.

*Moderator Brooke:* More about the South Atlantic Anomaly that Bill just mentioned -- that may be causing some of the streaking/flashing effects on the ISS cam right now:

[http://en.wikipedia.org/wiki/South\\_Atlantic\\_Anomaly](http://en.wikipedia.org/wiki/South_Atlantic_Anomaly)

Johnny: Out in Lancaster by Edwards AFB when and where please

Bill: Straight up. Between midnight and dawn local time.

Cbear: what time is the shower?

Bill: Between midnight and dawn local time.

Exmedic: I have a family member here that is asking for an explanation of the difference between meteors, and "fireballs"

Bill: Fireballs are meteors that appear brighter than the planet Venus.

Grimes: The Lyrids are peaking right now? I thought they peaked in 2 hours?

Rhiannon: Traditionally the Lyrids have peaked now (or about 20 minutes ago), but you can still see a significant number until sunrise.

Jake\_poo: just saw a few here about 45 miles north of Houston

Rhiannon: Fantastic! So glad for you.

Vicki: stuffed bumper shield I'm guessing it's a shield that bounces off these particles

Rhiannon: It is a Whipple shield. [http://en.wikipedia.org/wiki/Whipple\\_shield](http://en.wikipedia.org/wiki/Whipple_shield)

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Aaron: What's the link again for the ISS?

Rhiannon: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

XImmortal: I am sorry if this got asked already, how close does the comet itself actually come to earth?

Danielle: Comet Thatcher is a long period comet. It won't be back near the Sun until the year 2276. The last time it was near Earth, back in 1861, it was bright/close enough to be seen with the naked eye. I really don't have the numbers in front of me to give you an exact distance from the Earth, sorry.

JoshCryer: Wondering if you would be able to see them through fog, is it possible.

Bill: Not really.

*Moderator Brooke:* Sunrise on the ISS!!! For those who have asked, this is where you can view the ISS live Ustream feed: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Imsirius: What is your favorite deep sky object to view during the spring?

Bill: There are some nice galaxies in Leo.

Can: Will the Eta Aquarids be as visible at the Lyrids?

Rhiannon: The Eta Aquariids traditionally have a much higher rate than the Lyrids, though this year the Lyrids have a new moon, and the Eta Aquariids have a full moon. When there is a full moon the moonlight washes out many of the meteors and you will see a much lesser rate.

LTN: When you say that the Lyrids should be peaking right now do you mean mountain time? I know this might sound like a silly question but does this mean that since I am in the eastern time zone I am missing the peak time because of cloud cover or whatever reason? Or will I be able to see the peak shower at 3:30 eastern time?

Bill: The Lyrid peak is rather broad, so you will be able to see Lyrids between midnight and dawn, your time. This meteor shower is no over with in just a few minutes, so don't worry about missing it.

Ktradley: i got to see at least 1 for sure. it was neat to see. I think i'm a little too close to the city to get a good show of them. i dont see a lot of stars out, i can see a few, but not like i would in the country or outskirts of town. And i kind of loose patience when waiting for so long, especially looking by myself. Happy shower seeing everyone... Thanks bill and rhiannon for the answers. Hope the clouds go a way for you guys soon. \*Awesome Sunrise on the ISS station stream\*

Bill: Congrats! Yes, it is an awesome sunrise.

LTN: Also, since the peak time has passed .... how many more could typically be expected to be seen until sunrise 10, 20 or is it unpredictable?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: Yes. You can still expect between 10-20 per hour if you have clear skies, up until sunrise. Hope you get to see lots!

Eugenius: yea it's real foggy here, we' in san francisco, CA, but wife was able to catch two earlier

Bill: Congrats to her.

BP: Thank you Bill and Danielle for answering my '???'s for the North Fort Worth, TX area.... Clear Skies & Dark.. I am seeing ZERO..... Meteors... Oh well

Bill: You're welcome. Sorry that you haven't seen any meteors. Neither have we.

Ooheyeooh: I noticed during the ISS' sunset and sunrise that the sunlight seemed to "pulse" or vary in intensity. What causes that?

Bill: The camera automatically adjusts its gain.

Exmedic: when we see videos of meteors, or fireballs like from police dash cams etc, and then a flash, is the flash the result of the particles exploding?

Rhiannon: We see these meteors burning up because as the particle is travelling through space, electrons pop off the atoms (ionization), if the particle breaks apart, there is a burst of ionization and we see that as a flash.

Geeti: I am watching the lyrids on the iss feed. why are some lyrids showing up in different colors?

Rhiannon: The color flashes are from protons. A meteor should show motion across several frames. But it will have to be very bright to be detected.

Dakota: can meteor showers knock anything out of space - like satellites and such?

Danielle: There is a risk to spacecraft from meteoroids. The risk is mainly due to sporadic (aka background) meteors as opposed to meteor shower streams. Meteoroids have affected spacecraft in the past. Two examples include the Mariner IV and Olympus satellites. Mariner IV, a NASA planetary exploration spacecraft, encountered a meteoroid stream between the orbits of Earth and Mars in September of 1967. The dust detector registered 17 hits in 15 minutes. This bombardment caused a temporary change in attitude but no loss of power. There was some thermal shield damage, but the craft returned to normal operation within a week. Olympus, an ESA communication satellite, was struck by a Perseid meteoroid near the time of the shower peak in August 1993. It sent the spacecraft tumbling. By the time control was restored the onboard fuel had been exhausted, thus ending the mission.

Imsirius: The image from the ISS is BEAUTIFUL!

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Danielle: I agree! It's absolutely gorgeous. ☺

Berlin\_Pennsylvania: why is the sun red when it "rises" in front of the ISS

Rhiannon: You are still seeing a lot of atmosphere (the ISS is 400 km up), so it is the dispersion of light in the atmosphere.

Dan: will these meteors be noticeably bigger and brighter than some of the stars?

Bill: They will be a streak of light lasting one to two seconds.

Ktradley: question, are we seeing a sunrise or sunset for the part of the earth the ISS is over? does the ISS move with the earth or against it?

Bill: Sunrise. ISS moves with the Earth.

LTN: The skies here are clear but I have a few street lights interfering with my total darkness will this cause a huge interference with my viewing? I am far from a city but these street lights are making me awfully mad at the moment :-/

Danielle: It will interfere a bit, yes. Why don't you try to shade yourself from the street light? (Safely) sit in the shadow of a tree or building, giving yourself the largest field of view of the night sky as possible.

Exmedic: I've heard stories in the past of ISS crews taking shelter due to meteor showers and solar flares. I'm guessing the area they seek shelter in is better protected?

Bill: The ISS crews have not taken shelter because of meteor showers. They have taken shelter in the Soyuz capsules when a piece of space junk was predicted to pass very close to the Station.

XImmortal: Out of curiosity, all the reports of fireballs and meteors lately in the news, is that just because more people have cameras now. I guess I am asking, is there more meteors making contact with our upper atmosphere than previous years? Or relatively normal?

Bill: More people with cameras. No evidence that the meteor influx has increased.

Jake\_poo: I saw one big light streak then a lot of little ones, is that normal?

Danielle: I'm not sure -- are you looking at a video feed or are you outside?

Dan: I am in western Canada should I still be looking straight up?

Rhiannon: Yes! Hello fellow Canadian. ☺ Your best bet is to lie on your back and look up. And let your eyes adjust to the dark (can take 30-40 minutes).

Doug: Any predictions for the next time we will have a meteor "Storm" ?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: The Perseids are predicted to outburst (not storm) in 2016. They occur in mid-August.

Ktradley: thanks bill for all the answers to the questions.. i think i'm off to bed.. i have church in the morning.

Rhiannon: Thanks for coming and asking questions!

JoshCryer: Should I stop watching for the lyrids because of the fog, or should I hold out thorough it?

Bill: Up to you. I would say your chances of seeing Lyrids are small as long as the fog is there.

rgonzalezc17: I have only seen two very bright shooting stars

Rhiannon: Well we hope you get to see more. The shower is still going on! Our skies are hopefully going to clear soon in Huntsville.

Erik: Huntsville TX ?

Bill: Huntsville, AL.

Ktradley: i'm getting a telescope after tonights adventure

Bill: Congrats! Have fun.

LTN: WHats going on with the ISS feed I dont see anything anymore but a screen saver of some sort

Bill: Loss of signal from video feed.

Fkhan: Thanks for making technology accessible to the masses and stay classy NASA:)

Rhiannon: Thanks for tuning in! We are happy to do this. ☺

SmashingZwan; Does being around all of this incredible imagery (mostly referring to the ISS feed) on a daily basis take away any of the sense of awe and wonder that it inspires in us regular joes/jills? Or do you NASA folks still find yourself awestruck by the vastness and mysteriousness of it all?

Bill: We are very much awestruck and love watching it as much as you guys do.

Erik: where should i look? Between vega and Hercules?

Bill: Straight up.

Vohpoh: Is the ISS inside the Van Aleen belts; is that how the electronics inside are protected from radiation / induced EMF issues?

Bill: Yes.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Ktradley: any suggestions for a non expensive, first telescope?

Danielle: There are probably several online reviews you can consult. ☺

Aaron: I am off to bed; just wanted to thank you all for your time and answering the questions! Keep up the great work NASA!

Bill: You are welcome.

Caro: For anyone, i am on the west coast are the predictions of the meteor shower based on Eastern time?

Bill: The best time to see Lyrids is midnight to dawn your time.

rgonzalezc17: Question. I live in Mexico 36km from Mexico City, and have a fair view of the sky. Will the shower be viewable here?

Danielle: If you can see the stars in the Big Dipper you should be able to see meteors. The Lyrids are visible from Mexico.

XImmortal: Is there any kind of estimated number how many comets enter our solar system and circle the sun a year?

Bill: No idea.

Julimango: Are they visible from Trinidad & Tobago?

Rhiannon: Yup!

Fkhan: what's the total duration of this shower including invisible period due to sunrise?

Bill: Lyrid rate is above background for approximately three days.

BP: I agree with Aaron.. thank you Bill, Danielle, Rhiannon thank you for all your info.... When I was younger I wanted to be an Exercise Physiologist for the Astronauts.... bye for now!

Rhiannon: You are so welcome! We enjoy this. ☺

Ktradley: according to the radar, huntsville AL, is at the end of the clouds.

Rhiannon: Fantastic! We are keeping our eye on the feed.

IMURHUNNIBUNNY: when is the best time to watch pacific time

Bill: Midnight to dawn local time.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

rania.shehab.89: is the ISS live only now for the meteor, or i watch it anytime?

Rhiannon: It is always up.

Caro: We have an useasonably clear night in Washington state. I look forward to viewing the meteor shower. I went out about an hour ago and I saw one meteor

Bill: Congrats!

Grimes: just saw a couple lyrids up here in lawrenceburg. mission accomplished, time for bed.

Bill: Congrats!

Jslaming: Will the meteors be visible over the next few nights in the UK?

Danielle: Lyrid activity spans from April 16 to April 25, but the peak is short-lived. April 22 is the best time to view them. But you may see a handful a day either side of the peak. We saw some Lyrids in our all sky camera on the morning of April 21. These, and any we see today, tomorrow, etc, will be posted on the site <http://fireballs.ndc.nasa.gov/>. We also have posted a couple of Lyrids from last night on our Facebook page, NASA Meteor Watch.

Ktradley: thanks again guys.. its been a pleasure. again keep up the great work and i have really appreciated this chat. take care and hope clouds clear up for you guys

Danielle: Thanks for joining us!

poobear265: let me try this 1 more time..... We r near Sherman, TX, but we aren't seeing anything. Does anyone know why??

Rhiannon: The Lyrids are not a shower with huge rates. Expect between 10-20 meteors per hour if your skies are clear. Also make sure you are letting your eyes adapt to the dark. That can take 30-40 minutes.

Krissydear: i'm not sure if you guys would know, but are there any good places to go in Southern California, to watch the meteor shower?

Rhiannon: Anywhere that is not flooded by city lights is a good location!

SmashingZwan: Why is the ISS stream periodically replaced with a still image?

Rhiannon: Occasionally we lose the signal. But it seems to be coming back on fairly quickly.

cc4525: san angelo tx.. just saw 2 streaks for sure..within last 10..mins..brighter than a shooting star

Rhiannon: Glad you saw some!

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Xlmmortal: Do you know the exact orbit of this comet, if that is possible, is there a diagram by any chance?

Danielle: Comet Thatcher is a long period comet -- i's period is about 415 years. It was discovered in 1861. It will be back again in 2276. As it's only been observed 1 time, i's orbit is not well known. You can see an orbit diagram on the JPL Small-Body Database Browser at <http://ssd.jpl.nasa.gov/sbdb.cgi?sstr=thatcher;orb=1;cov=0;log=0;cad=0#orb>

Grimes: what are some other major meteor showers throughout the year, preferably ones with high rates of meteors.

Rhiannon: The meteor showers with higher rates (Geminids, Perseids) mean that when the Earth is travelling through the stream left by the asteroid/comet, it is a more dense stream than, say, the stream left by Comet Thatcher which created the Lyrids.

Vohpoh: I'm envious of anyone who gets to look at such beauty for a profession, congrats!

Rhiannon: Thank you! We so enjoy our jobs. It is a privilege to be a part of American's space program.

Vicki: Is there a local astro club near or in Toronto?

Rhiannon: Hello fellow Canadian! I would recommend checking out the Royal Astronomical Society of Canada. <http://rasc.ca/> It has chapters all over Canada and is a great club to be involved in.

Beth: what time will it be visible in oregon?

Danielle: The Lyrid peak is expected now. The Lyrid radiant will keep rising too, so Lyrids should be visible through the night until sunrise.

CLK: Just saw 2 meteors over about a 15 minute span. I'm in Arlington Tx near a big dark park. It's cool outside - need a jacket to stay out later.

Danielle: Awesome, I'm so excited for you!! ☺

Fkhan: do we know the origin of comets?

Bill: Comets are left over primordial ice and dust from the formation of the solar system.

Josh: will i be able to see them if its cloudy outside in Toronto?

Bill: No. Need clear skies.

Dicnan: I live in southern Arizona. Where in the sky do I look for the shower?



**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Danielle: You don't need to look in any particular direction. Just find a safe, dark place away from lights. Lie on your back and look up, letting the night sky fill your field of view.

Emmett: I did some shots from my yard but there was so much light pollution I don't think I caught anything. If I go out to about 10-15 miles from the city will that make for a decent improvement or is it still too close?

Rhiannon: It depends on how big of a city you live in. Any separation from city lights are good.

Aads: So is the meteor shower still going on or what?

Danielle: Still going on! Rates are only 20-25 meteors per hour, according to the International Meteor Organization.

Fkhan: what's the average size of a comet? or do they come in all shapes and sizes? also, do we have a similar term as "half life" attached to them as they lose mass in their orbit?

Bill: Comet nuclei generally range from one to twenty kilometers in diameter. No, I do not know of a term to describe a comet's "half life."

XImmortal: How are comets classified , if they are? Or are they all just comets?

Bill: There are long period comets and short period comets. There are Jupiter family comets, among other categories. Comets are classified by their orbits.

Someone: Do you know where the location is to see the meteor shower?

Danielle: Most places can see the Lyrids (not Antarctica though), but it is best seen from the northern hemisphere.

rania.shehab.89: I REALLY HATE THE CLOUDS !!! i've never ever seen a meteor before in my life !! and the clouds REALLY Destroyed my chance today !!! I

Danielle: I understand your frustration. ☹ If you are giving up on the Lyrids tonight, let me just say that the Perseids in August and the Geminids in December are usually really good performers -- so please try again then!

Vohpoh: How long would it take for a comet, like Haley's Comet, to have its orbit become more circular?

Bill: Halley's Comet will never have a circular orbit. There aren't enough forces acting on it circularize it.

Fkhan: since comets are relatively small chunks of ice in space, what stops them from melting away due to sun light rather quickly?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Comets sublimate (go from solid ice to gas) several meters of their surface each time they pass around the Sun. That's a lot of material and eventually all that's left is a small rocky core than can be mistaken for an asteroid.

Utahdude: look to the east, I've seen a few out here so far

Bill: Congrats.

XImmortal; How close would a comet have to come, to be affected by earths gravity? And really, thank you Bill, Danielle, Rhiannon, and Brooke. I have really learned quite a bit tonight. Nasa Rocks in my book

Bill: Any body passing within 1.5 million kilometers of Earth will have its orbit perturbed by Earth's gravity.

Anlk: Is any moderator receiving my messages?

Bill: Yes.

SmashingZwan: How often do you hold these chat sessions? Do they occur on some sort of regimented schedule or only during noteworthy (I guess that's subjective) activities in space?

Bill: We have these whenever there's a significant meteor shower and when we can assemble the folks needed to do a good job.

Fkhan; which planet in our solar system runs into meteor showers the most?

Bill: I really haven't thought about that, so I don't have an answer. But it's a good question.

Dbrown: This question may been asked before or it may be silly but is ISS at a higher risk during these showers?

Danielle: It's not a silly question at all. Most of the risk (about 90%) to spacecraft is from sporadic or background meteoroids, not showers. The Lyrid flux is small compared to the sporadic flux. Occasionally a meteor shower will outburst or storm (with rates over 1000 meteors per hour) and this will represent a time of increased risk to ISS and other spacecraft. Luckily ISS is well-armored.

Luvmy: I was just out in Central Iowa and saw one good one and two small flashes before the clouds moved in.

Bill: Congrats! We're still waiting for the clouds to disappear here.

Anlc: When is the next major meteor shower scheduled to happen?

Bill: The next major meteor shower is the Eta Aquariids in early May. These are pieces of Comet Halley.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
April 21, 2012**

---

Luvmy: Where is this camera located? Thanks.

Bill: At Marshall Space Flight Center in Huntsville, AL.

cc452: have u seen showers with 1000 per hour?

Rhiannon: Bill has! The Leonids put on fantastic shows in 1999 and 2001.

Fkhan: do/can you guys hold a similar chat for active solar flare event? or that is not your area of expertise?

Rhiannon: That is not our area of expertise. However NASA puts on chats for many events.

<http://www.nasa.gov/connect/chat/index.html>

XImmortal: Do comets/meteors actually benefit or do anything good for the solar system, or are they just kinda out there floating around aimlessly on there orbit?

Bill: Some scientisst think they brought the building blocks of life to Earth. Many would consider this a good thing.

Sherap: is cam looking straight up?

Bill: No, it is pointed just above the North Star Polaris.

Luvmy: How accurately are you able to identify the intensity of the shower?

Rhiannon: Fairly accurately. Our all-sky cameras may only see a few Lyrids a night (or a few per hour), and are hampered by clouds, but there are other detection systems like radars that will see many more, and get more accurate intensities.

Daya: When is the next 1000 per hour shower predicted?

Bill: Don't know of any within the next twenty years.

LDB: Leonids were amazing. never seen anything like that.

Rhiannon: Glad you got to experience them as well! I wish I had!

Rob: Well... if you ever NEED clouds just wait for the shower to peak... :-)

Danielle: Murphy's Law. Unfortunately. ☺

Caro: Can you give me some idea or some of the things that NASA has learned from comets and meteors? And can you also explain how you can tell what comet these meteor showers come from. Thanks for your time..

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: The Meteoroid Environment Office's main function is to quantify the danger to spacecraft from meteors, therefore all the science we do has engineering applications. We figure out things such as densities, speeds, and fluxes.

Rhiannon: Caro: (meant to add this onto my answer). We can know the orbit of a meteor from our all-sky cameras, and if a comet is known to have the same orbit as a meteor shower, it is thought to be its parent body.

Rob: Why doesn't the comets debris cloud disperse over the years until there isn't anything left for the earth to hit?

Bill: The old stuff does, but the comet keeps producing new debris, which we run into.

Bethw: just saw a couple in portland, or

Bill: Congrats.

V: I am in Flagstaff AZ and i want to wake my little girl to see the meteors. I can't figure out what time to go look! Any idea?

Rhiannon: Wake them up between midnight and 6 a.m. local time... hopefully you will have clear skies!

Peanutbutter: do you think i will see them in burbank cali

Rhiannon: If you have clear skies, yes.

LDB: What is the minimum visual magnitude for a meteor to be considered for the per hour count?

Bill: 6.5, but even skilled observers are hard-pressed to see meteors fainter than 4th magnitude.

James: hi any body saw the lyrid???

Rhiannon: We have had many people sign in to tell us they have seen Lyrids! ☺

Ali: Ok so, i went out at 12:00 and within a 2 hr period saw 11 meteors total, 3 of them were fireballs :)  
Good luck to everyone trying to view the shower..

Bill: Congrats!

*Moderator Brooke:* This is a hearty group of 100 -- good to have you here in the chat for the wee hours of the morning.

cc4525: any links to video of those showers for us to view?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Danielle: No we don't have any links to videos with 1000 meteors/rates, sorry. I believe we have some saved videos from the Geminids last year, though. Check out <http://www.ustream.tv/recorded/11429252>

Rob: Im sure someone asked but what is this comets period?

Bill: 415 years.

Hurley\_WI\_35: Are the skys suppose to clear out at NASA soon ?

Bill: We hope so.

Rob: Shower nerds... we are a special breed...

Rhiannon: Indeed ☺

Fkhan: didn't we land on a comet in the recent past? or is the mission still in progress?

Danielle: Deep Impact impacted Comet Tempel 1. The Rosetta spacecraft plans to land on comet 67P in a couple years. That's all I can think of at this late hour.

josh1: Are any meteor showers expected to outburst this year like last years Draconid outburst in the southern hemisphere?

Bill: No. Normal year for meteor activity.

XImmortal: When a meteor makes it all the way to earth, are they hot or cold?

Rhiannon: When the particle is burning up in the atmosphere, it is very hot. However if it slows down enough and stops burning while there is still some of the particle left, it cools off on its way down to earth and by the time it reaches the ground, it is cold.

*Moderator Brooke:* An update on the balloon cam. "The payload includes the NASA low-light video camera, two GPS trackers, two Hero2 GoPro cameras, and a cryogenic thermometer. We are receiving GPS data from the payload. The balloon is currently ascending over the Sierra Nevada range near Bishop, Calif. Launched at 11:53 p.m. PDT." Coordinates as of 12:09 a.m. PDT: Latitude=37.31692, Longitude=-118.59526"

Caro: Can the particles be radioactive? And if so, Is there any kind of danger?

Bill: No.

Jeremy: has there been regular activity this evening?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Danielle: Unfortunately we've had nothing but clouds here in Huntsville, AL. Our New Mexico cameras have seen some meteors, but no word on whether they've been identified as Lyrids. The International Meteor Organization has had Lyrid reports. Check out <http://www.imo.net>

Johnny: why do they travel in oppisite directions

Bill: I do not understand the question.

Peanutbutter: or would it be better to go see them in la canada

Rhiannon: Well, I am biased, but I think Canada is a great place to watch a meteor shower. ☺

Robkleinpeter: How much of its total mass will this comet loose during its 415 year orbit?

Bill: It will lose several meters of its surface while it is within two astronomical units of the Sun. Don't know what that translates into in terms of mass.

Xlmmortal: I feel stupid asking this, but is the only difference between a comet and a meteor a tail?

Bill: A comet is much bigger than a meteor (kilometers versus millimeters). You are correct that comets do have tails, but the real difference between the two is size. Meteors start out as tiny pieces of comets.

*Moderator Janet:* ISS sunrise ☺

Troy13: Watching here in El Paso, TX. Sky is nice and clear, but have only seen a couple of meteors. Is it likely to get more active later on?

Danielle: Well, we expected the peak around 5:30 UTC -- that's 12:30 central time. But the weather has been so cloudy here in Huntsville, AL we haven't seen much of anything. The expected peak was based on past observations of the Lyrid shower, whose peak has varied from April 21 21:30 til April 22 8:30 UTC in the past, according to the International Meteor Organization. On top of this variation, the Lyrid radiant is still rising higher in the sky as we speak. This will contribute increased meteor numbers as the morning progresses. So there's still a chance for activity.

Fkhan: can we create artificial meteor showers for fun:)

Bill: Funny you should ask that. Back in the late 1960s, NASA had Project Trailblazer which involved a seven stage sounding rocket. The first three took a small iron "BB" up to about 400 kilometers altitude, whereupon the final four stages fired the BB straight down into the atmosphere, creating a meteor. So even though we did not create a meteor shower, we did create an artificial meteor.

Rob: What year did this comet last pass the earths orbit?

Danielle: The parent comet, Comet Thatcher, was first discovered in 1861 when it was near perihelion, or the closest part of its orbit to the Sun. It has a 415 year period, so it is next expected in 2276.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

josh1: I'm often told watching meteor showers in a light poluted area is bad but last year i watched the geminids near Los Angeles and counted 40+. Was this a coincidence or were there more fireballs associated with that particular shower?

Bill: There are more fireballs associated with the Geminids and Perseids, so you can see quite a few of those meteors even in the suburbs.

Emmett: Well guys, it was cool chatting. I've got to go. Enjoy the rest of your late night!

Danielle: Thanks for joining us, Emmett!

Karminapie: Did you see any meteors yet? Do you think we'll be able to see it in the bay area of California?

Bill: It is cloudy here, so no meteors. If the Bay Area is still foggy, I do not think you will be seeing meteors there.

josh1: I would assume the geminid meteor shower in december will be one of if not the best showers this year especially since it's going to be a new moon. Agree?

Rhiannon: The Geminids and Perseids should both be great this year as the moon won't interfere much. Let's hope for clear skies! ☺

Peanutbutter: i just see a bright white dot in the sky moving very very slow you almost cant tell its moving what is it?

Rhiannon: Likely a satellite.

Emmett: When I was very young my mom found a rock about half the size of a baseball that was covered in black bubbles. I've never seen anything like it before or since. Could that have been a meteorite?

Rhiannon: It is possible, though not probably. If you want it checked out, bring it into a geology department at a local university.

josh1: clouds are expected to clear soon :) how much sky does the cam cover?

Danielle: The Ustream from Huntsville, AL covers about a 25 degree field of view. I'm keeping my fingers crossed on the clouds. ☹

*Moderator Brooke:* More about the balloon cam -- see the path of the first 20 minutes of its flight here: <http://www.flickr.com/photos/nasamarshall/7101296287/in/photostream>

Johnny: I'm sorry I guess my question is do meteors appear to travel in oppisite directions across the sky...thank you

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Bill: Shower meteors appear to come from the same direction, called the "radiant," so they are moving together, not opposite each other.

Peanutbutter: do comets light up the sky or are they a little white dot that goes fast

Rhiannon: Most comets can only be seen by telescope. It is rare for a comet to get close enough to the Earth for us to see it with our naked eye.

cc4525: any chance for a surprise storm of meteors ?lol

Danielle: Well a storm is technically defined as a meteor shower with rates of 1000 meteors per hour or more. We don't expect that from the Lyrids!!! The Lyrids HAVE outburst in the past, however -- their rates got up to 90 meteors per hour or so in 1982. So there is always a chance for some increased activity. One can always hope.

Peanutbutter: what about meteors how can u tell u saw one

Danielle: Meteors in the video cameras usually appear as fast moving streaks of light.

*Moderator Brooke:* We see a star on the Ustream feed over Huntsville -- finally, the clouds may be breaking!

Anlc: I saw another big white streak move across the southern sky here in Corpus Christi, TX. It was very noticeable and it moved in the same general direction the other 2 I saw in the northern sky around the peak time. Should I continue to look in this direction for more to come or straight up?

Bill: I would recommend straight up, but it's your call.

Peanutbutter: kk thanks im going up to the verdugo mts right now wish me luck lol

Rhiannon: Good luck!

josh1: spaceweatherradio.com for those of you wanting to hear the meteor pings. it's quite enjoyable

Rhiannon: Thanks for the recommendation, Josh!

XImmortal: Well I jsut officially drooled on my keyboard. I am off. Thank you again for all the information, and keeping the folks on the ISS safe, i will definetly be visiting the Nasa website more often for future chats. Have a great night.

Rhiannon: Awesome. You are so welcome!

Jesterov: what is the zenith, exactly?

Rhiannon: Zenith = the point in the sky directly above you.



**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Anlc: Ok thanks Bill. I had also noticed (or thought I noticed) a few other faint fast streaks too. I didn't notice any of this until about 15 minutes ago before I came and asked my previous question. Is this indicative of more meteors to start showing up soon here?

Bill: Hopefully so.

LawrenceKun: Can someone please help me? If I want to look at it later before dawn, should I look about 30 mins or should I look an hour before sunrise?

Rhiannon: I would recommend at least an hour. It takes your eyes 30-40 minutes to adjust to the dark.

Fkhan: what's the total number of meteor showers we experience in one year on earth? or does it vary each year?

Bill: It is roughly the same from year to year. At last count, there were about 250 meteor showers, most of them very minor (unless you were a very experience meteor observer, you wouldn't be able to tell there was a shower going on.).

Cristiansanz: Hey guys. I'm in southern California and it's really cloudy, but I can still see some stars. If I go out there and keep watching, is there any chance I might see anything?

Bill: If you can see stars, you have a shot at seeing meteors.

Anlc: Okay. Then i'll keep my fingers crossed. Gonna go back outside and keep watching up \* : )) \*.

Danielle: Good luck!!!

*Moderator Brooke:* More about the balloon camera! Here's a photo of the balloon partially inflated prior to flight: <http://www.flickr.com/photos/nasamarshall/6955265336/in/photostream>

josh1: what would you consider your favorite meteor shower of the year? i prefer the geminids because of their multicolor display of meteors meteors

Bill: The Geminids are my favorite as well. Not only are they the strongest annual meteor shower, but they originate from an asteroid 3200 Phaethon, which kind of makes them a mystery.

Fkhan: Thanks NASA gals/guys, it was fun talking to you and I got quite a bit of info out of you!!! I am off to bed. Talk to you in May probably.

Danielle: Thanks for joining us! It was our pleasure!

JoshCryer: Well, I just feel asleep and the impact of my face on the desk woke me back up. I think it's time for bed. Thanks for answering all my questions and other rambling. Love you all at NASA and everyone answering questions! Night!

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: You are so welcome! Sleep well!

Jaybee: Hello all, it is cloudy here in Baltimore. But I'm listening to Space Radio. From what I'm hearing, the 20 meteors per hour estimate is spot on.

Rhiannon: Fun! Thanks for the info.

josh1: what leads many to believe the perseids are the best meteor shower?

Rhiannon: Perseids are often a favorite due to being in August and hence not as cold to stay up all night.

Karminapie: I'm from the bay area, around San Francisco. It's not cloudy. Do you think I have a chance?

Rhiannon: If it is not cloudy, you have a chance of seeing Lyrids. If you can get out of the city a bit to where there is less light pollution, that would be best.

Lichtechno: In Germany the sun is shining. But thanks to NASA, all your All-Sky-cameras, spaceweatherradio.com and the great Astronauts and Cosmonauts at the ISS I can enjoy the Lyrids while I am having breakfast :-)

Rhiannon: Love it! Thanks for sharing that.

BulletFX: Gday

Rhiannon: Hello. Thanks for joining us!

SmashingZwan: What a great (and educational) way to spend an evening/morning. Thanks so much for letting us pick your brains! I hope those pesky clouds clear up soon for you guys. Take care and keep up the phenomenal work! =)

Rhiannon: So glad you joined. And thanks for the encouraging feedback!

*Moderator Brooke:* More tracking information on the balloon camera:  
<http://www.flickr.com/photos/nasamarshall/7101349277/in/photostream>

rania.shehab.89: Thanks guys !! you really helped alot today and it was really fun to talk to you and also an honor !! thanks alot :), P.S. I still hate clouds :@ :D!

Bill: You are welcome.

Jamie: Hi! Happy stargazing! Any chance for a quick roundup of the best cameras available for those just joining? Thanks so much in advance!

Rhiannon: Our camera here in Huntsville has been clouded out all night. The ISS feed is [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html) and has been showing awesome views

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

(currently there is a loss of signal but it has been coming back on quickly), though no confirmed meteors either. Check out [www.facebook.com/NasaMeteorWatch](http://www.facebook.com/NasaMeteorWatch) for some Lyrids on the all sky cameras.

Berlin\_Pennsylvania: are there any other meteor showers happening this year?

Bill: Yes, the Eta Aquariids in May, Perseids in August, Orionids in October, Gemenids in December, just to name a few.

BulletFX: Will this be visible in Australia its just getting dark now and clear skies here.

Bill: Yes, but you need to wait until after eleven p.m. local time.

Jaybee: The Leonids in November.

Rhiannon: Indeed.

josh1: aren't the lyrids known for their dust trails that can last for several seconds after the meteor streaks?

Bill: Lyrid fireballs have been known to produce persistent trains.

Berlin\_Pennsylvania: Do you know how many confirmed meteors there are?

Bill: Don't understand the question. There have been many millions of meteors observed over all the years.

Berlin\_Pennsylvania: the cloud cover is thinning

Rhiannon: ☺

*Moderator Brooke:* The balloon cam to (hopefully) view Lyrids meteors from above Earth's atmosphere is floating to its destination. Here's a short video of the excitement around its launch:

<http://www.flickr.com/photos/nasamarshall/6955291876/in/photostream>

kenny\_c: It is 4:05 here and the rain has just started in earnest. Guess that ends my time outside for this go-round. I appreciate the company and great information. Sure hope the clouds clear so you folks can see something on your Ustream cam. Good night!

Rhiannon: So sorry your skies aren't clear either. Thanks for the feedback... and for tuning in!

josh1: a few years back when watching the perseids i saw a fireball just after the sun had set and the sky was still somewhat bright. (no stars out yet) how rare was this?

Rhiannon: Fireballs near sunset or sunrise would be rare, though daytime fireballs are even more rare (but still seen occasionally).

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
April 21, 2012**

---

Sa: I could see the meteor in Indonesia at what time dan until what date?

Rhiannon: Midnight to 6 a.m. local time.

Berlin\_Pennsylvania: I meant how many were confirmed over the past couple hours

Bill: The International Meteor Organization is reporting a rate of twenty to twenty-five Lyrids per hour, so you can infer that an observer with perfect skies would have seen somewhere around sixty meteors over the past three hours.

Sheryl: Sheryl, Seattle: Where is Lyra in the Seattle sky at 1:00 a.m.? Which direction should I look?

Rhiannon: Lyra is in the north/northeast. However to observe Lyrids you'll want to lie on your back and look up. Don't look directly at Lyra. I hope you see some!!

Me: 5 in the last hour in the Denver metro area, with light pollution - My neck hurts now....

Rhiannon: So glad you got to see some though! Sorry about your neck.

Berlin\_Pennsylvania: how long will the iss continue to send live feed?

Rhiannon: This live feed is a standard thing. Not just for the meteor shower. However we have been in contact with Don Pettit, an astronaut on the ISS currently, who is looking specifically for meteors with cameras on the ISS.

josh1: have there been any recently reported daytime fireballs? maybe within the past few years

Bill: Yes. There was a daytime fireball observed over Texas earlier this year.

*Moderator Brooke:* The latest on the balloon camera coordinates -- over the White Mountains east of Bishop, Calif.: <http://www.flickr.com/photos/nasamarshall/6955313620/in/photostream>

josh1: thanks. apparently the daytime fireball was recent. april 2nd to be exact

Rhiannon: I recall hearing about that.

Jaybee: Josh,YouTube has several fireball and Bolide videos on-line.

Rhiannon: Yup. Some great videos of meteors on youtube.

Berlin\_Pennsylvania: have there ever been fatalities from meteors or meteorites

Rhiannon: No known deaths. Though there was a woman injured from a meteorite puncturing her roof and bouncing off her wall and hitting her.

josh1: How can i determine if i have seen a fireball or just a brighter than normal meteor?

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Rhiannon: Fireballs are as bright as the planet Venus or brighter. It is hard to put a meteor into a specific category unless the photometry (light analysis) is done properly.

Spacey: How long should we stay outside to see something? My niece chickened out after 5 minutes.

Rhiannon: If you really want to see Lyrids, stay out for longer than 30 minutes. ☺

BulletFX: say you were to find a piece meteor would it be worth alot of money ?

Danielle: The price of a meteorite is based on a lot of things, including the type of meteorite it is (with lunar and martian meteorites being the most rare and therefore most expensive), and whether it made the news. There are several sites online that are in the business of selling meteorites; you can do a search for those to get a good idea of prices.

Jesterov: i saw a fireball in the late 90's...i was had just gotten out of work at 7 am, and was walking home. it was just getting light out. it must have lasted 5 seconds or more and appeared to break up into several pieces. spacejunk maybe?

Bill: Sounds like a fireball, not space junk.

d0lphina: I havent really seen much...Im from Utah, USA....(I even have live meter radar echos...& there isnt much on that either? =(

Rhiannon: Sorry you haven't had much luck! We haven't either. ☹

Jaybee: How long will the balloon camera stay aloft?

Rhiannon: 2.5 hours.

Anzu: only saw one, but with my weather conditions its good enough haha

Danielle: Great! Yeah, a lot of places have cloudy weather right now -- my skies included!

Jaybee: In what year will we see another Leonid 'storm' ?

Rhiannon: In 15ish years.

Jaybee: I hope I'm still around! LOL

Danielle: Don't we all. ☺

d0lphina: K...Ive started to hear echoes from my meteor radar.....crazy!!

Rhiannon: Great!

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

*Moderator Brooke:* An update on the balloon cam from Tony Phillips at Science@NASA: "We haven't heard from the balloon payload for nearly half an hour. The payload is now above the tropopause and entering the stratosphere where our GPS trackers have some trouble communicating with us. The sky up there is jet-black--even at noon time. We are approaching the edge of space and we might not hear from the balloon again until it pops and the payload is parachuting back to Earth. Even during this temporary GPS blackout, all data from the onboard cameras are being properly stored for later analysis."

Boomer\_31: I saw one go by with my neighbor in SoCal =)

Rhiannon: Sweet! A bit jealous. ☺

BulletFX: So 11 pm Australian time i should start looking up ??

Rhiannon: Yup. Best viewing times will be between midnight and 6 a.m.

Jaybee: From the pings I'm hearing on Space Radio. The count sounds closer to 30 Lyrids per hour.

Rhiannon: Cool!

Anonymous: is there a peak time for this meteor shower?

Rhiannon: The peak of the shower was about 3 hours ago. But the rates are still high. And the best viewing time is between midnight and 6 am local time.

*Moderator Brooke:* Quick -- look -- the Ustream is clear with a couple of bright stars. Clouds, be gone! ☺

Jaybee: Maybe next year we could have a live cam on the ISS looking down.

Rhiannon: [http://www.nasa.gov/multimedia/nasatv/iss\\_ustream.html](http://www.nasa.gov/multimedia/nasatv/iss_ustream.html)

Bracketer: has anything been seen here?

Rhiannon: In Huntsville, AL, no. ☹ We have been clouded out. We have seen several Lyrids on our all-sky cameras in New Mexico, though. And Lyrids last night in the NM and Southern networks. Check out [www.facebook.com/NasaMeteorWatch](http://www.facebook.com/NasaMeteorWatch) to some see videos.

*Moderator Brooke:* A very pretty, clear Lyrid image captured by ELP ALLSKY out in El Paso tonight -- our thanks for this one! <http://www.flickr.com/photos/nasamarshall/6955345674/in/photostream>

Bracketer: what are the chances of the ISS getting nailed by one of these particles?

Rhiannon: The ISS is often hit by meteors (though the chances of a Lyrid are quite small), but it has armor and is very well-protected so there has never been severe damage from them.

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Caro: Ok for the few I have seen they seem to be taking a southeast to northeast track.. question. I saw one that seemed to have its own agenda and has a more southerly to north track. Is that a different meteor?

Danielle: The Lyrids, the Pi Puppids, and the Eta Aquarids are active this evening, along with the sporadic aka background meteors. So you could be seeing any of these meteor types. If you see a meteor try to trace it backwards. If you end up in the constellation Lyra (in the north/northeast) there's a good chance you've seen the Lyrid.

*Moderator Brooke:* We have about 10 more minutes in our chat, so if you have questions for our astronomers, please send them in...

gunslinger9919: While inside I am watching the MMT0 All Sky Camera based at UofA Tucson, AZ. Is that video camera providing constant feed while also capturing a photo every 10 seconds. The Clock appears to stop and start. How would you see a meteor moving if it is a snapshot?

Bill: There would be a streak on the image.

Me: Thank you - Bill , Danielle, & Rhiannon for your insight, as well as the Moderators. Hope some people got to see the show - Good Night All

Rhiannon: You are so very welcome. Thanks so much for joining us.

Berlin\_Pennsylvania: Will there be chats for the future meteor showers?

Rhiannon: Yes - we tentatively have these chats planned for the Perseids in August and the Geminids in December.

Bracketer: let me rephrase, is there any way to get the guys on the station to aim the camera in the direction of the meteors with something in the background?

Danielle; Astronaut Don Pettit has set up cameras inside the International Space Station to do that, while ISS's external video cameras point towards Earth in an attempt to capture Lyrids from space. The external video is what's on the live video feed.

Jaybee: I would also like to add my thanks for everyone who made this chat so informative. :-)

Rhiannon: Thanks for your kind words. ☺

Caro: Thanks to all of you, I appreciate your time. I loved chatting with the experts. Please keep these informative sessions going. :)

Rhiannon: Thanks for tuning in for so long, Caro!

Bill: Thank you all for participating!

**'3-D' Lyrid Meteor Shower: Up All Night NASA Chat**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**April 21, 2012**

---

Danielle: I've had a good time tonight, despite the clouds. Thanks for joining us everyone!

Rhiannon: Thank you to everyone who joined us tonight!

*Moderator Brooke:* Thanks for being here tonight, everyone! Thanks to our chat experts, Bill, Danielle and Rhiannon for answering all of these questions -- and thank all of you for participating in the chat. Have a good weekend, and check back for a chat transcript later this week.