

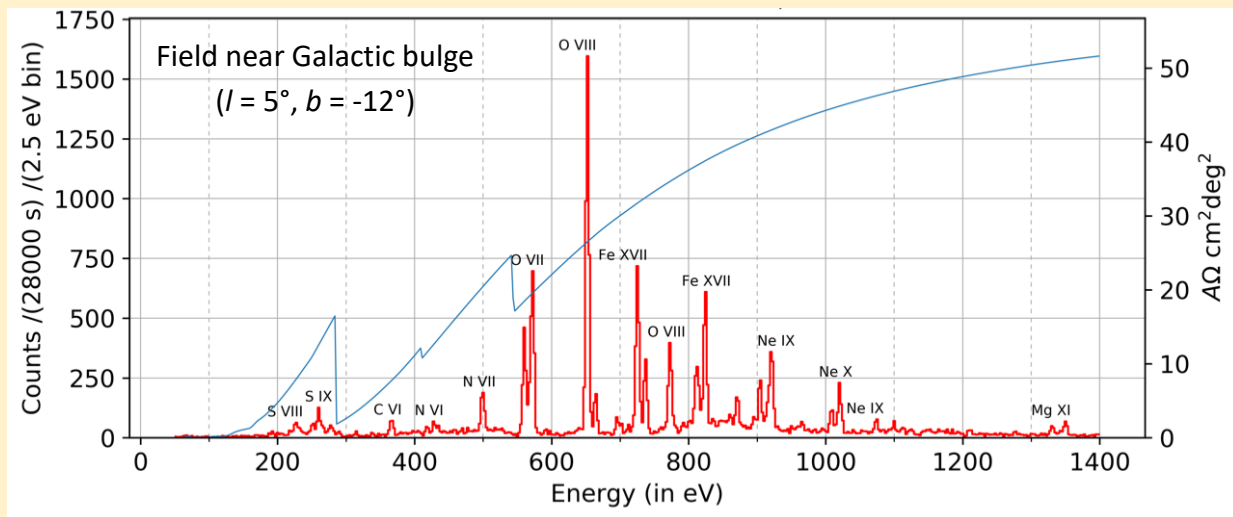
XQCSat - A Diffuse Hot Gas Explorer

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NASA/Decadal Science Question	XQCSat Science Objective
What controls the mass-energy-chemical cycles within galaxies?	Measure ion temperatures and abundances in hot gas near active star forming regions to gain insight into how stellar feedback transports energy and atoms.
What are the flows of matter and energy in the circumgalactic medium?	Determine the physical state of the medium surrounding the Milky Way galaxy to understand how it was formed and is heated.

The Value of High-Resolution X-Ray Spectroscopy with XQCSat

- Measure abundances and distributions of ions in the hot phase of the interstellar medium by resolving individual soft X-ray emission lines.
- Make independent measurements of the temperatures of multiple ionic species using spectral line intensity ratios.
- Determine the excitation mechanism, thermal versus charge exchange, by measuring the ratio of forbidden plus intercombination to resonance line intensity.

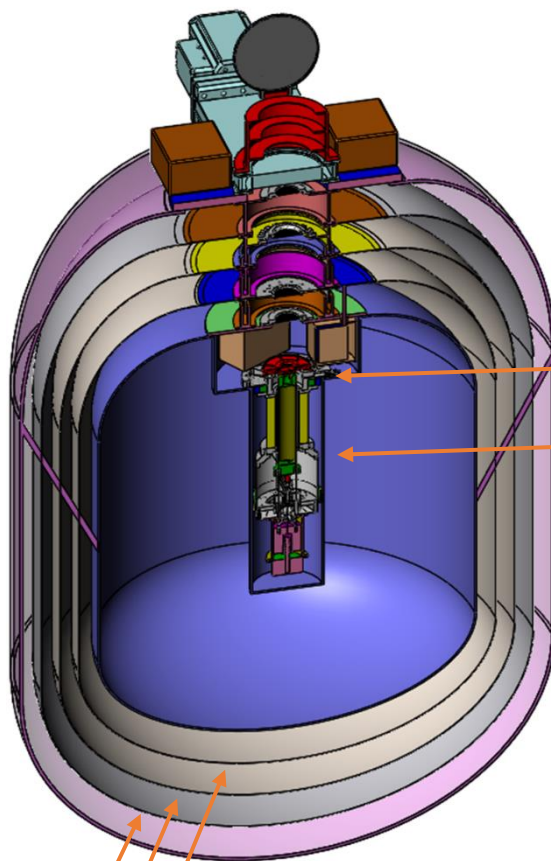


XQCSat's unique capability to study hot gas in and surrounding the Milky Way will provide new insights into how our home galaxy was formed and evolves.

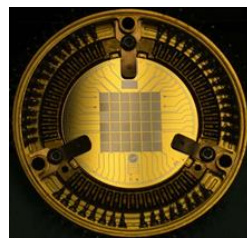
XQCSat Mission

- Proven X-ray microcalorimeter technology enables high-resolution ($\Delta E \sim 6$ eV), wide-field X-ray spectroscopy.
- Exceptional diffuse emission sensitivity ($> 100\times$ XRISM) produces strong science return with a few weeks mission.
- Microsatellite bus from Blue Canyon with proven components is cost effective.
- Cryostat design exploits flight demonstrated liquid helium cryostat technologies.
- ESPA Grande format minimizes launch costs.

All technologies are at high TRL. XQCSat is ready to fly now.



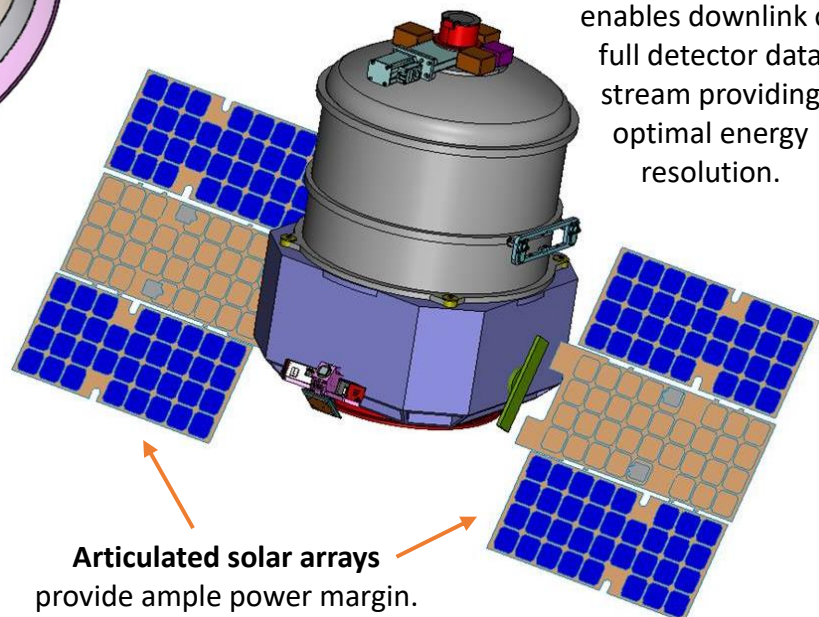
Vapor-cooled shields provide cryogenic temperatures with low power consumption.



Detector array and adiabatic demagnetization refrigerator have been proven on multiple sounding rocket flights.

Team has the expertise needed for mission success.

- University of Wisconsin – XQC rocket instrument
- University of Iowa – Science operations
- Blue Canyon Technologies – Microsat bus
- Lockheed Martin Space – Cryostat
- NASA/GSFC – Cryogenics and Detectors



X-band radio enables downlink of full detector data stream providing optimal energy resolution.

Articulated solar arrays provide ample power margin.