NASA, JAXA XRISM Satellite X-rays Milky Way's Sulfur

An international team of scientists have provided an unprecedented tally of elemental sulfur spread between the stars using data from the XRISM spacecraft.

When a doctor performs an X-ray here on Earth, they place the patient between an X-ray source and a detector. Bone and tissue absorb different amounts of the light as it travels through the patient's body, creating contrast in the detector. To study interstellar sulfur, astronomers did something similar.

They picked a region of gas and dust with the right density — not so thin that all the X-rays would pass through unchanged, but also not so dense that they would all be absorbed.

Then the team selected a bright X-ray source behind that region, a binary star system called GX 340+0 located over 35,000 light-years away in the southern constellation Scorpius.

Using the Resolve instrument on XRISM, the scientists were able to measure the energy of the GX 340+0's X-rays and determined that sulfur was present not only as a gas, but also as a solid, possibly mixed with iron.

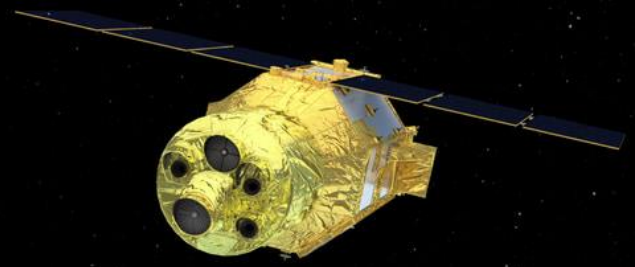
Scientists are interested in learning more about sulfur because it was important to the formation of life on Earth and continues to help cells function now. Iron-sulfur compounds are often found in meteorites, so researchers think they might be one way sulfur travels through the universe.

This composite shows a section of gas and dust scientists X-rayed for sulfur using XRISM. Binary star system GX 340+0 is the blue dot in the center. The composite contains a blend of imagery in X-rays (represented in deep blue), infrared, and visible light. Credit: NASA's Goddard Space Flight Center/DSS/DECaPS/eRosita

Paper: https://academic.oup.com/pasj/advance-article-abstract/doi/10.1093/pasj/psaf068/8176460?login=true
Story: https://science.nasa.gov/centers-and-facilities/goddard/nasa-jaxa-xrism-satellite-x-rays-milky-ways-sulfur/

More About XRISM

- Technology developed for XRISM could improve nuclear safeguards. The mission's instruments require extremely high spectral resolution, which can be used to detect isotopes of different kinds of radioactive nuclear materials, like uranium. This ability could be incorporated into screening instruments. The same technology could improve trace contamination analysis.
- New and improved instruments for X-ray missions drive industry partners to make improvements in superconducting materials that could be used in quantum computing.



Artist's concept of the XRISM spacecraft. Credit: NASA's Goddard Space Flight Center Conceptual Image Lab