

Argon hydride is created when argon ions react with hydrogen molecules, though the two are usually found in completely different parts of a nebula.

"But we soon realized that even in the Crab Nebula, there are places where the conditions are just right for a noble gas to react and combine with other elements," Barlow said.

For these and other reasons, the researchers note the study is as much about the nebula as it is about argon.

"This is not only the first detection of a noble-gas based molecule in space, but also a new perspective on the Crab Nebula," said Göran Pilbratt, Herschel project scientist at the European Space Agency. "Herschel has directly measured the argon isotope we expect to be produced via explosive nucleosynthesis in a core-collapse supernova, refining our understanding of the origin of this supernova remnant."

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## NEWS ITEM ( NARRATION )

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### CRAB NEBULA: NOBLE GAS MOLECULES DETECTED IN SPACE FOR THE FIRST TIME

Noble gas molecules have been detected in space for the first time ever, a team of astronomers has announced.

The detection was made in the Crab Nebula, the remnants of a star that exploded 1,000 years ago and is 6,500 light years away, using the SPIRE ( Spectral and Photometric Imaging Receiver ) on board the European Space Agency's Herschel Space Observatory.

The noble gases ( argon, helium, neon, xenon, radon, and krypton ) are chemically unreactive, and therefore do not easily combine with other elements. In the right circumstances, they can form molecules, although this had only ever been achieved on Earth in laboratory conditions.

However, noble gas molecules in the form of argon hydride ions have now been detected outside the laboratory, in space.

"Discovering argon hydride ions here was unexpected because you don't expect an atom like argon, a noble gas, to form molecules, and you wouldn't expect to find them in the harsh environment of a supernova remnant," said Professor Mike Barlow from University College London who led the study.