Researchers from Harvard-Smithsonian Center for Astrophysics (CfA) have conducted detailed spectroscopy of N132D—an X-ray bright supernova remnant (SNR) in the Large Magellanic Cloud (LMC). Results of the study, presented in a paper published April 15 on the arXiv pre-print server, provide important information about the chemical composition of this SNR and shed more light on its origin.

"In this work, we have presented spatially resolved X-ray spectroscopy of N132D, the brightest SNR in the LMC, based on archival Chandra observations," the paper reads.

The study calculated the mean local (LMC's environment) abundances of oxygen, neon, magnesium, silicon, sulfur and iron. The results show that oxygen and sulfur abundances are enhanced on the north-western and north-eastern rim of N132D, respectively. Moreover, a faint blob protruding outside the western rim exhibits enhanced abundance of oxygen, what suggests that it could be an oxygen-rich ejecta clump.

By analyzing Chandra data the astronomers found the iron K complex emission in N132D is distributed largely across its southern half and is not located in a single feature. It is assumed that a silicon-rich relatively hot plasma (above 1.5 keV) is behind this emission.
The astronomers estimated that mass of the progenitor of N132D should be around 15 solar masses and concluded that this SNR is a result of a core-collapse supernova.

"Our analysis leads us to conclude that SNR N132D probably resulted from the core-collapse of an intermediate mass progenitor, in a cavity in the CSM [circumstellar medium] created by pre-supernova winds," the researchers wrote in the paper.


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