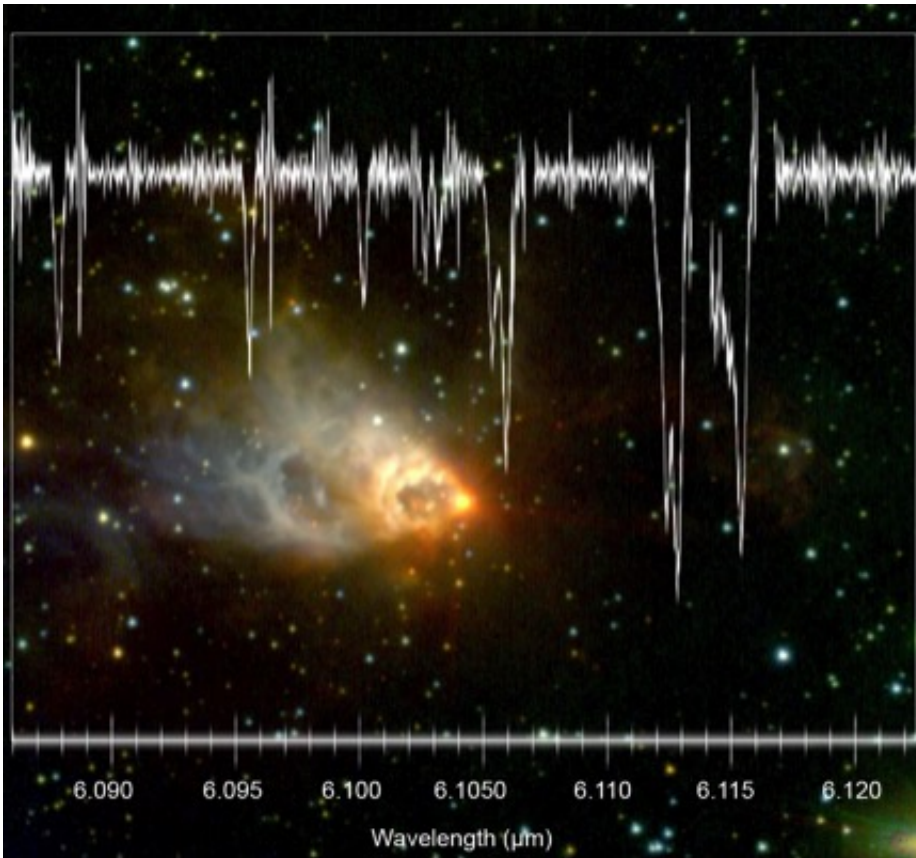


SOFIA pinpoints water vapor in young star

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Infrared spectrum of the protostar AFGL 2591 made by the EXES instrument on SOFIA, superimposed on an infrared image of the protostar and the nebula that surrounds it, made by the Gemini Observatory. Credit: Spectrum Image: NASA/DLR/USRA/DSI/EXES Team/N. Indrolio (U. Michigan & JHU); Credit Background Image: C. Aspin et al. / NIRI / Gemini Observatory / NSF

A team of scientists using the Stratospheric Observatory for Infrared

Astronomy (SOFIA) has pinpointed the amount and location of water vapor around a newly forming star with groundbreaking precision.

Using data collected aboard SOFIA, the team determined that most of this young star's water vapor is located in material flowing away from the star, rather than within the disk of [matter](#) orbiting around it. This location is unexpected, indicating that if planets formed around this star, they might receive only a small fraction of the water in the system.

These observations were made possible by using SOFIA's airborne vantage point in the Stratosphere—at an [altitude](#) above 99% of Earth's water vapor, which prevents this type of measurement from the ground—as well as the precision and sensitivity of the EXES (Echelon-Cross-Echelle Spectrograph) instrument aboard SOFIA. The instrument spreads infrared light into its component colors with very high detail, providing scientists with more information about this light than was previously possible.

"This detection of water vapor would have been impossible for any ground-based observatory, and there are currently no space-borne telescopes providing this capability," said SOFIA project scientist Pamela Marcum. "These mid-infrared observations allow us to directly measure the amount of [water vapor](#) in this young star, expanding our understanding of the distribution of water in the universe and its eventual incorporation into planets. The water detected today could be the oceans of tomorrow in planets that form around these new stars."



The Stratospheric Observatory for Infrared Astronomy (SOFIA) lands at its base operations located at NASA Armstrong Flight Research Center Hangar 703 in Palmdale, California. Credit: NASA

Provided by NASA

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