Stratospheric Observatory for Infrared Astronomy (SOFIA)

Allowing astronomers to study the solar system and beyond from 38,000-40,000 feet altitude

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SOFIA
Stratospheric Observatory for Infrared Astronomy

NASA DLR USRA DSI

Infrared Astronomy in the Stratosphere

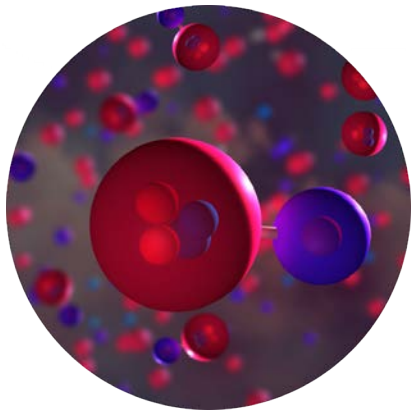
Making discoveries about our solar system and the universe

Stratospheric Observatory for Infrared Astronomy (SOFIA)

World's largest flying observatory features a 106-inch primary mirror and a telescope that weighs 37,500 pounds

Missions fly above 99% of the Earth's water vapor, enabling studies of the universe at infrared wavelengths

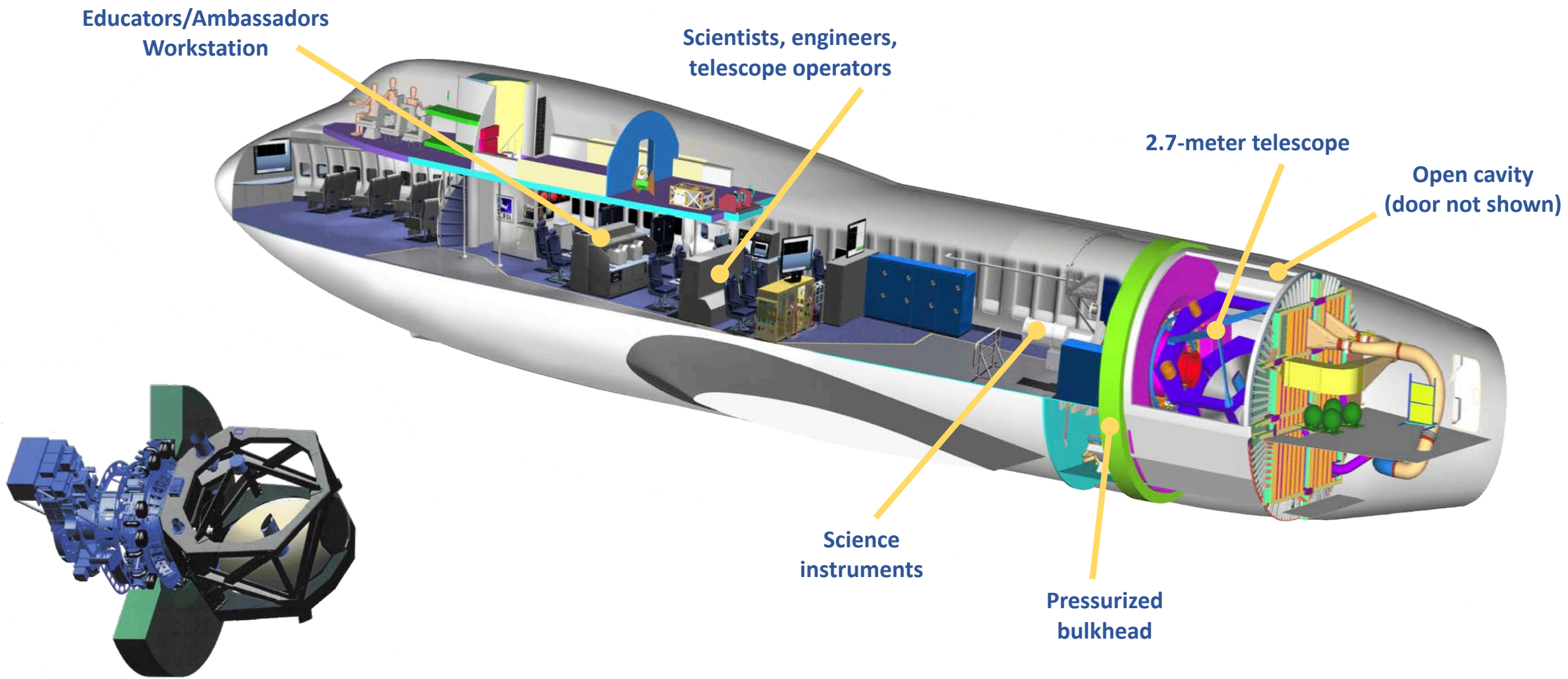
The Birth of Stars and Planets



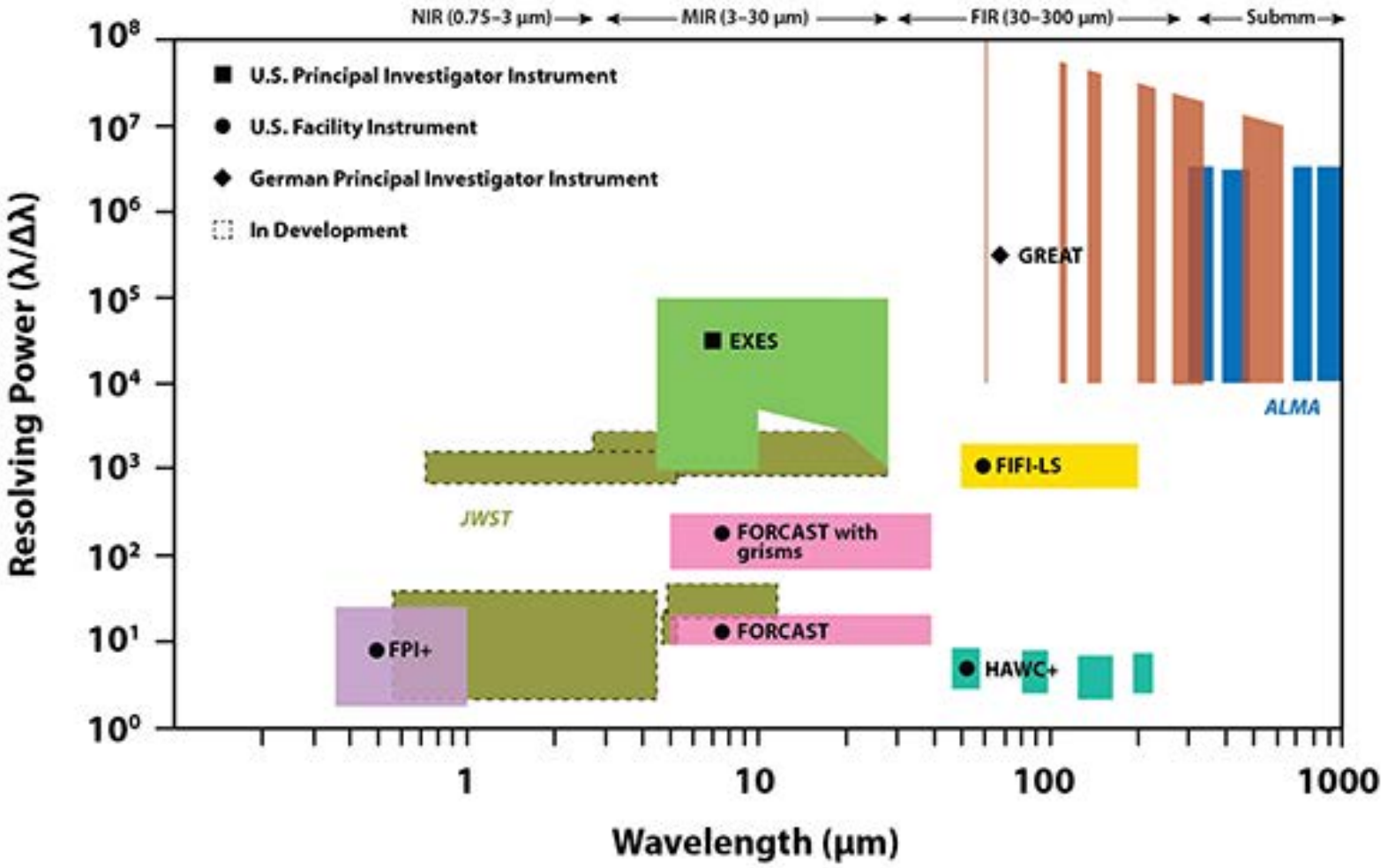
Path to Life: Our Interstellar Origins

Magnetic Fields and the Distant Universe

SOFIA Boeing 747-SP Platform Layout



SOFIA Science Instrument Suite



SOFIA's instruments bridge gaps in between existing ground-based observatories, like ALMA, and future space telescopes like JWST.

SOFIA Science: Pluto's Atmosphere

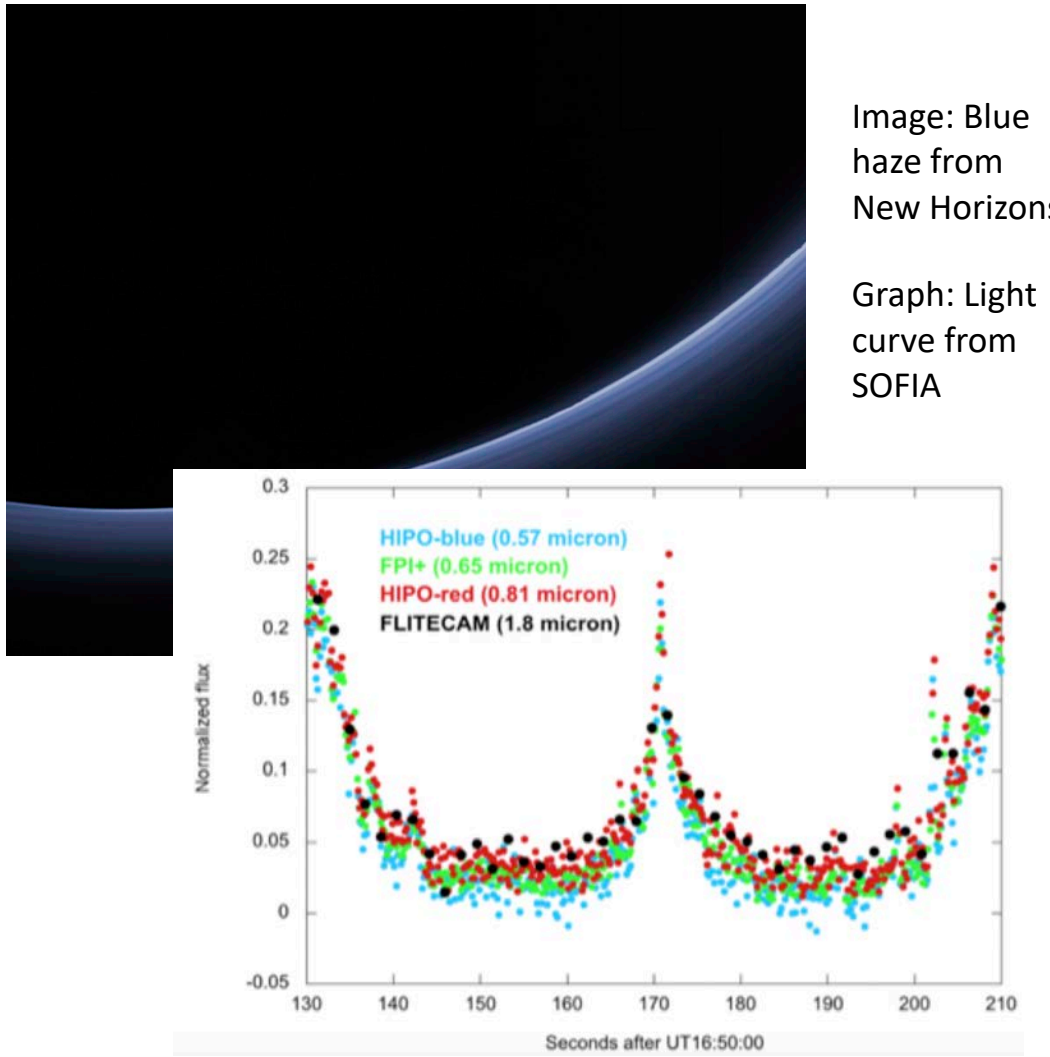


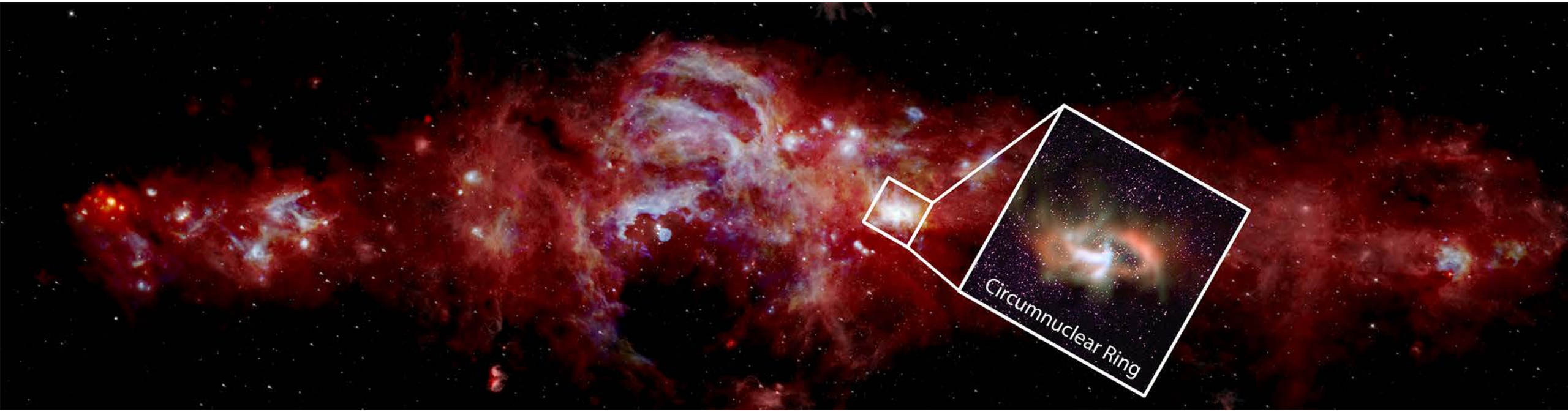
Image: Blue haze from New Horizons.

Graph: Light curve from SOFIA

Clues Hidden in Pluto's Haze

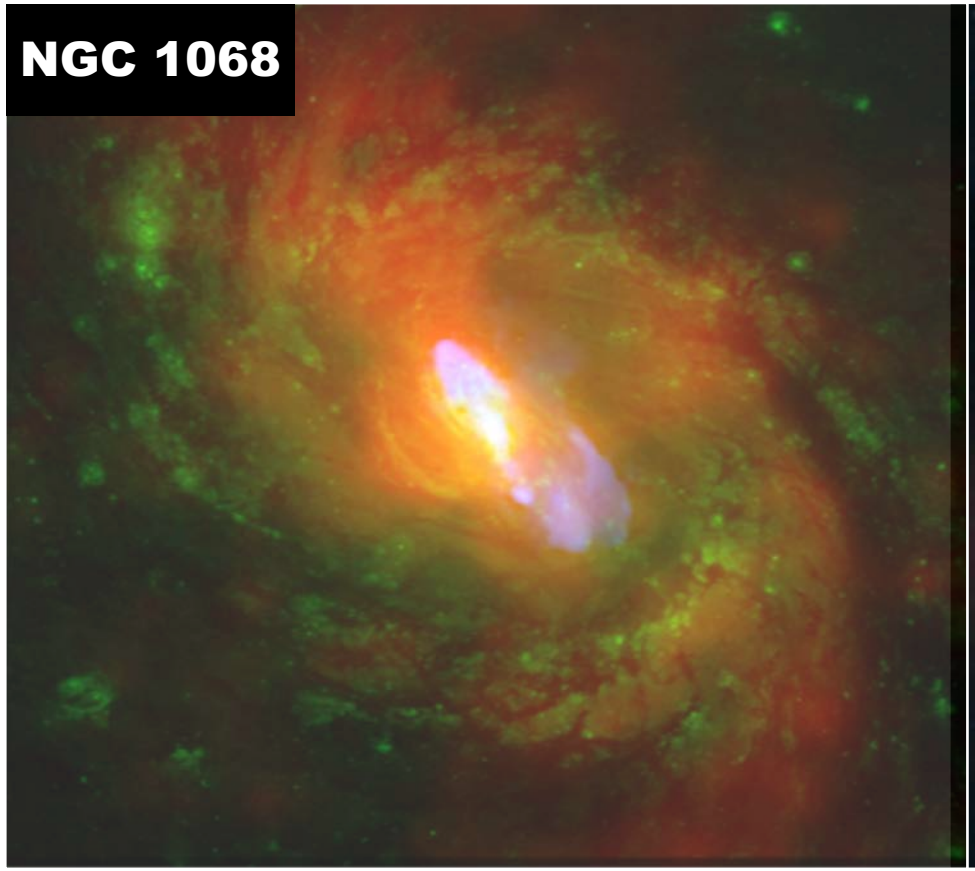
- Images from the New Horizons spacecraft show a blue haze.
- SOFIA studied Pluto two weeks before the spacecraft arrived.
- SOFIA's multiwavelength observations reveal the particles in the haze are 1,000 times smaller than a human hair, which scatter blue light and create the tint.
- The haze also thickens and fades in a regular cycle. This suggests Pluto may be able to hold on to its atmosphere, even as it moves farther from the Sun in its orbit.

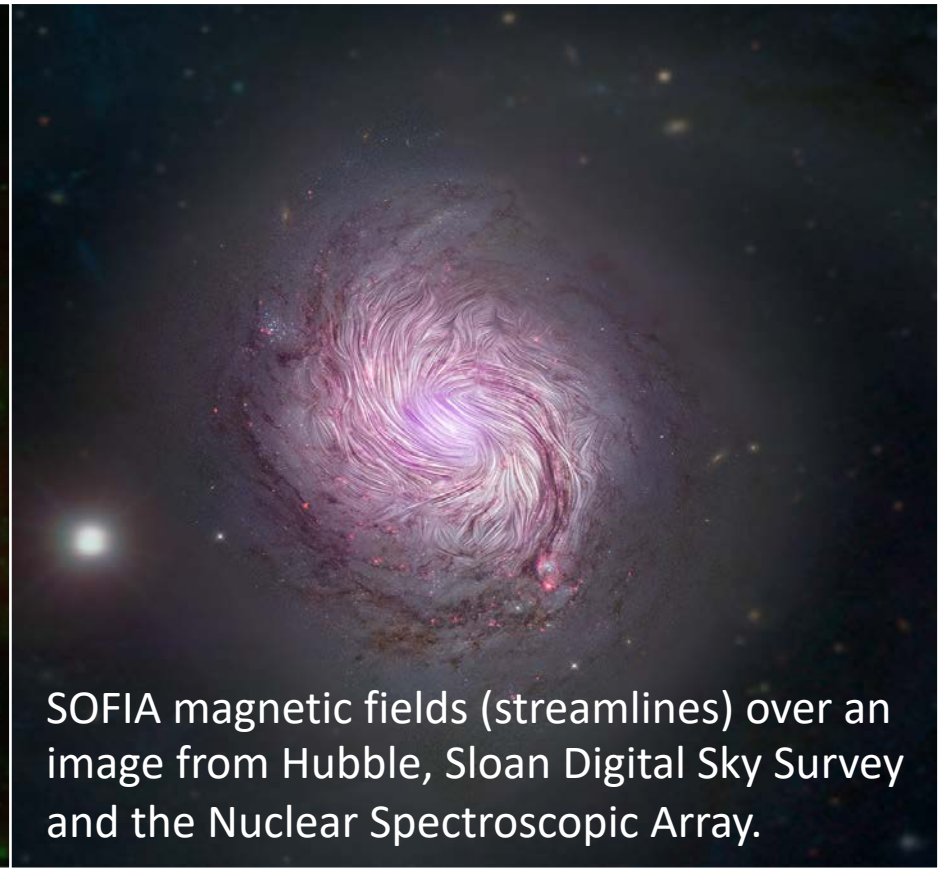
SOFIA Science: Milky Way



SOFIA mapped the center of our Milky Way Galaxy, including the ring of gas and dust surrounding the central black hole. The mid-infrared wavelengths observed by SOFIA reveal details that other observatories could not detect.

SOFIA Science: Star and Galaxy Formation





SOFIA magnetic fields (streamlines) over an image from Hubble, Sloan Digital Sky Survey and the Nuclear Spectroscopic Array.

Do magnetic fields control the spiral structure of this galaxy?

A new instrument on SOFIA is allowing astronomers to study the role of magnetic fields in star and galaxy formation, including how spiral galaxies get their iconic shape.

SOFIA Science: Interstellar Dust

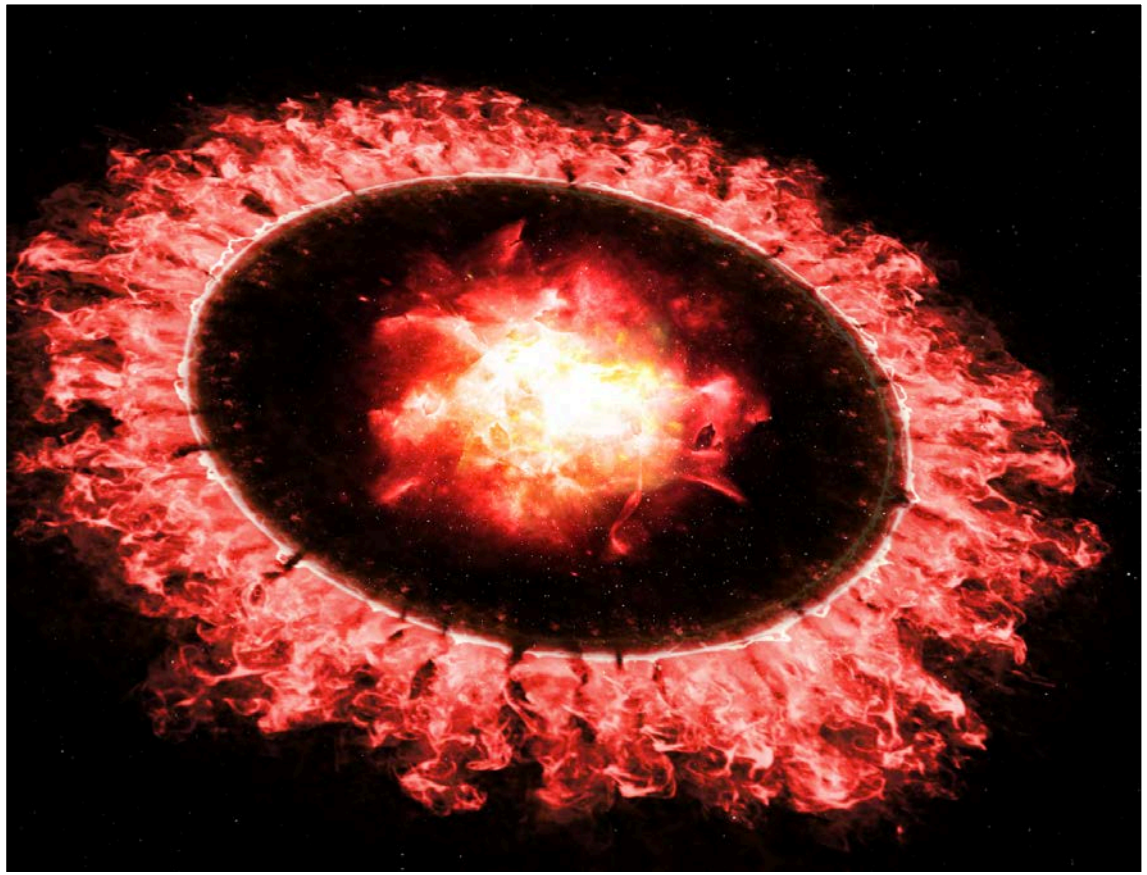


Illustration of the blast wave passing through the ring of dust around Supernova 1987A.

SOFIA shows interstellar dust survives a supernova explosion

- A supernova blast wave propagates through space at more than 6,000 miles per second and should destroy nearly everything in its path.
- SOFIA found 10 times more dust than expected around Supernova 1987A.
- The discovery suggests dust, a building block of stars and planet, may be able to reform or grow in the wake of a supernova explosion.

SOFIA Science: Path to Life and Interstellar Origins

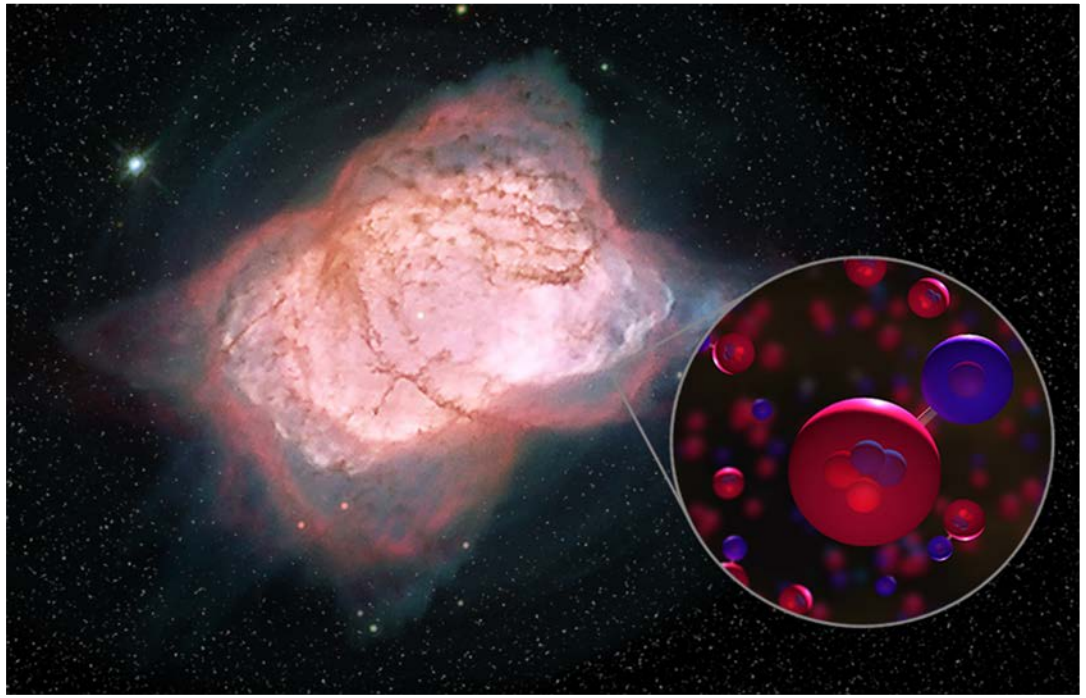


Image of planetary nebula 7027 (Hubble) and illustration of helium hydride molecules SOFIA detected.

SOFIA Found the Universe's First Type of Molecule

- Helium and hydrogen combined to form helium hydride, the universe's first molecule, about 100,000 years after the Big Bang
- Helium hydride was the first step in a chemical evolution, that transformed the universe from simple molecules to the complex place it is today.
- Helium hydride should be present in some parts of the modern universe, but it had never been found in space — until SOFIA detected it.
- SOFIA's detection confirms a key part of the basic understanding of the early universe.