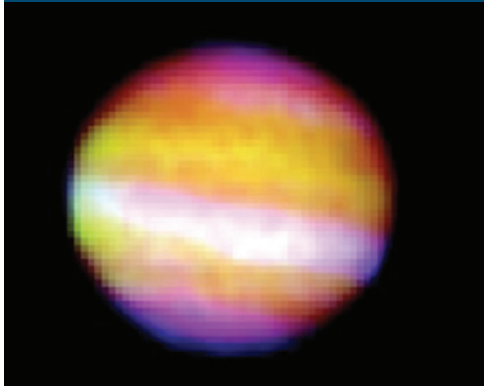
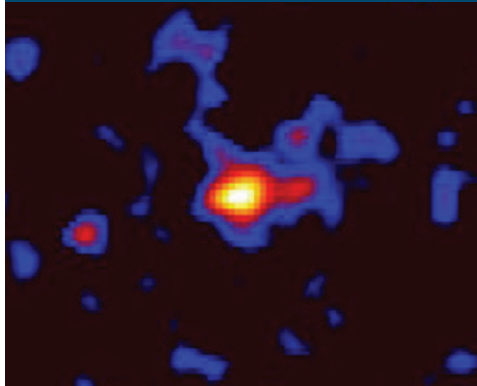


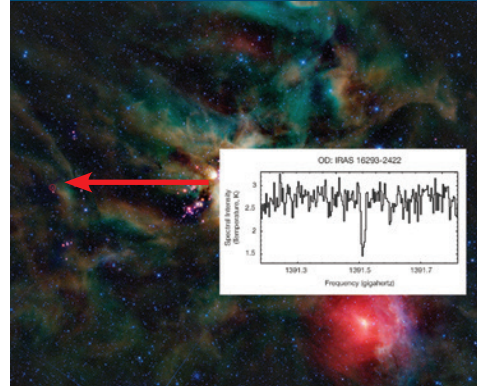
1. PLANETS



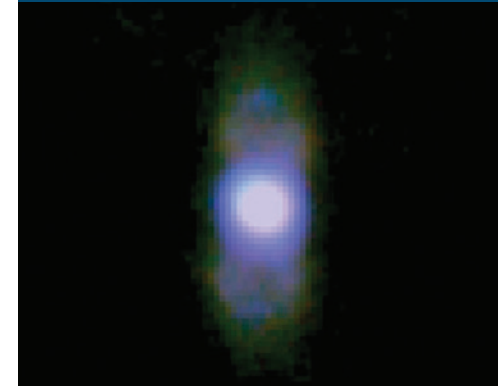
2. COMETS



3. ASTROCHEMISTRY



4. PLANETARY NEBULAE

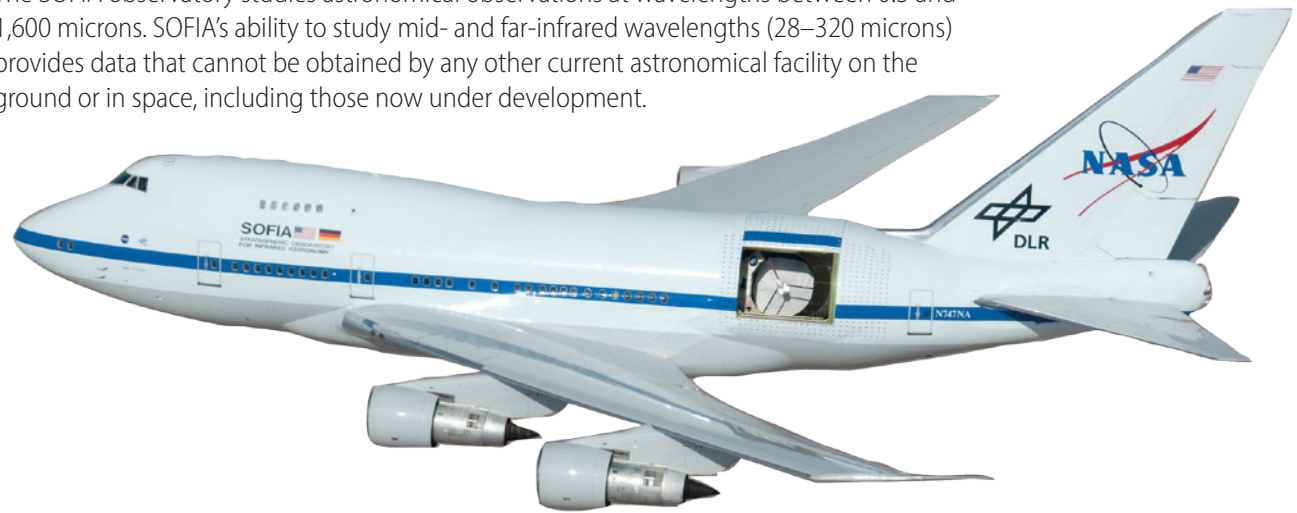


SOFIA

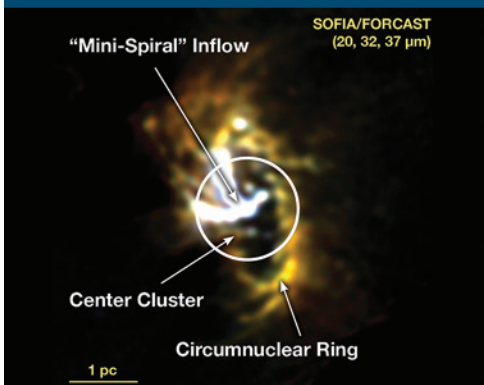
Stratospheric Observatory for Infrared Astronomy

STUDIES

The SOFIA observatory studies astronomical observations at wavelengths between 0.3 and 1,600 microns. SOFIA's ability to study mid- and far-infrared wavelengths (28–320 microns) provides data that cannot be obtained by any other current astronomical facility on the ground or in space, including those now under development.



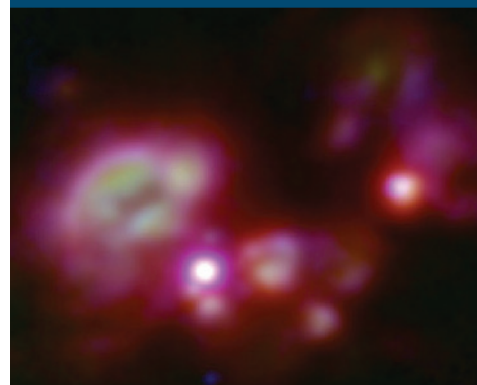
5. GALACTIC CENTER



6. SUPERNOVAE



7. STAR FORMATION



INSTRUMENT SUITE

- EXES** • spectrometer • 4.5–28.3 microns
- FIFI-LS** • spectrometer • 51–203 microns
- FORCAST** • mid-IR camera • 5–40 microns
- FPI+** • imaging photometer • 0.36–1.1 microns
- GREAT** • far-IR spectrometer • 63–612 microns
- HAWC+** • far-IR camera/ imaging polarimeter • 50–240 microns

1. PLANETS

Infrared image of Jupiter from SOFIA's First Light flight composed of individual images at wavelengths of 5.4 (blue), 24 (green) and 37 microns (red) made by the FORCAST camera. Ground-based infrared observations are impossible at 5.4 and 37 microns and normally very difficult at 24 microns even from high mountaintop observatories, such as Mauna Kea, due to absorption by water and other molecules in Earth's atmosphere. The white stripe in the infrared image is a region of relatively transparent clouds through which the warm interior of Jupiter can be seen.

5. GALACTIC CENTER

Researchers using SOFIA captured new images of a ring of gas and dust seven light-years in diameter surrounding the supermassive black hole at the center of the Milky Way, and of a neighboring cluster of extremely luminous young stars embedded in dust cocoons. The SOFIA mid-infrared image of the Milky Way Galaxy's nucleus shows the Circumnuclear Ring (CNR) of gas and dust clouds orbiting a central supermassive black hole. The bright Y-shaped feature is understood to be material falling from the ring toward the black hole that is located where the arms of the "Y" intersect.

2. COMETS

Images of Comet ISON were obtained using the FORCAST camera at wavelengths of 11, 20, and 32 microns. Measurements at 32 microns, shown here, crucial for determining the temperature and other characteristics of the comet's material, cannot be made using ground-based telescopes. In these images, the comet's tail and resulting dust trail points to the upper right of the photo (images smoothed slightly during processing).

6. SUPERNOVAE

The central portion of Messier 82 (M82) includes supernova 2014J in this image made by the FLITECAM instrument (first generation, retired) at wavelengths of 1.2, 1.65, and 2.2 microns. (North is at the top, east to the left.) Supernovae are relevant to life on Earth; most of the atoms in the universe more massive than iron (such as iodine, nickel, lead, gold, silver, and platinum) are made during supernova explosions.

3. ASTROCHEMISTRY

SOFIA can identify spectral fingerprints of the processes creating the universe's water at wavelengths inaccessible to any other observatory. A deep "trough" in spectral brightness observed at a frequency of 1391.5 gigahertz (wavelength of 215.6 microns) with SOFIA's GREAT spectrometer indicates abundant deuterated hydroxyl (OD) molecules in the interstellar material between Earth and a protostar at the position indicated by the arrow. Exactly how hydrogen and oxygen atoms "find each other" and bond to produce water molecules in the extreme environment of space is surprisingly complicated and requires further study.

7. STAR FORMATION

Researchers using SOFIA's FORCAST camera have captured images of a recently born cluster of massive stars named W3A. The cluster is 6,400 light years from Earth and is seen lurking in the depths of the large gas and dust cloud from which it formed. The energetic radiation and strong winds from these stars will eventually shred and disperse their birth cloud, possibly triggering the formation of more stars in adjacent clouds. Astronomers using SOFIA aim to better understand the effects the largest stars in the cloud have on their smaller siblings and on the cycle of star birth.

4. PLANETARY NEBULAE

SOFIA mid-infrared image of the planetary nebula Minkowski 2-9 (M2-9), also known as the Butterfly Nebula. The nebula is composed of two lobes of gas and dust expelled from a dying star with about twice the mass of our Sun that is seen at the center of the lobes. The SOFIA image shows mostly solid grains condensing in the gas, and was made at mid-infrared wavelengths of 20, 24, and 37 microns. The 37-micron wavelength band detects the strongest emissions from the nebula and is impossible to observe from ground-based telescopes.

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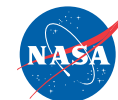
YouTube

youtube.com/user/SOFIAObservatory



1. NASA/SOFIA/USRA/FORCAST Team/James De Buizer; 2. NASA/Jim DeBuizer/Diane Wooden; 3. Background image: NASA/JPL-Caltech/Spitzer; Spectrum: NASA/SOFIA/ MPIFR/Parise, *et al.*; 4. NASA/DLR/USRA/DSI/FORCAST Team/M. Werner, *et al.*/A. Helton, J. Rho; 5. NASA/DLR/USRA/DSI/FORCAST Team/Lau, *et al.*; 6. NASA/SOFIA/FLITECAM team/S. Shenoy; 7. NASA / DLR / USRA / DSI / FORCAST team / F. Salgado, A. Tielens, J. De Buizer.

SOFIA is a joint project of NASA and the German Aerospace Center (DLR). NASA Ames Research Center at Moffett Field, California, manages SOFIA's science and mission operations in cooperation with the Universities Space Research Association (USRA) headquartered in Columbia, Maryland, and the German SOFIA Institute (DSI) at the University of Stuttgart. The observatory is maintained by NASA Armstrong Flight Research Center and based at the center's Palmdale, California, facility.



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