

SOFIA

Science Newsletter



February 2023

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Science Spotlight



The SOFIA/FORCAST Galactic Center Legacy Program

While the Milky Way galaxy is “average” in several regards, the environment in the central ~200 pc is unlike any other part of our galaxy. This region, known as the central molecular zone (CMZ), has high molecular gas densities, high gas and dust temperatures, significant turbulence, and a strong gravitational potential well, which combine to create a very unusual and complex star formation environment that has more commonalities with actively star forming galaxies compared to the Milky Way as a whole (Mills 2017 and references therein). Our relative proximity to the CMZ provides a unique opportunity to study star formation on size scales that are simply inaccessible in other galaxies.

However, in stating these similarities, there is an important difference that should be considered, because the CMZ is relatively inefficient at forming stars. In fact, the observed global star formation rate in this region is deficient by an order of magnitude or more compared to theoretical expectations based on its molecular gas reservoir (Longmore+ 2013). This is a significant conundrum in our understanding of this Galactic Center (GC), and potentially has broad implications for observational star formation tracers that are used to study other galaxies.

In order to study this star formation quandary in further detail, one of SOFIA's Legacy Programs targeted infrared bright regions within the GC to conduct a census of recent high-mass star formation. [Read more here.](#)



Composite infrared image of the center of our Milky Way galaxy, spanning 600+ light-years across. New data from SOFIA taken at 25 and 37 μm , shown in blue and green, is combined with data from the Herschel Space Observatory, shown in red (70 μm), and the Spitzer Space Telescope, shown in white (8 μm). SOFIA's view reveals features that have never been seen before. Credit: NASA/SOFIA/JPL-Caltech/ESA/Herschel

Observatory News

New Director of SOFIA Science Mission Operations

We are pleased to announce that Dr. William (Bill) Reach has become Director of SOFIA Science Mission Operations (SMO), effective February 15, 2023. Bill joined the SOFIA project in 2010. He previously served as Associate Director, SOFIA Science Center, with broad research interests spanning interstellar clouds, supernova remnants, evolved stars, and planetary science. Prior to joining SOFIA, Bill worked for more than a decade as a research scientist at the Caltech Infrared Processing and Analysis Center (IPAC), following postdoctoral appointments at NASA's Goddard Space Flight Center and the Institut d'Astrophysique Spatiale in France. Bill holds an A.B. from Cornell University and a Ph.D. from the University of California, Berkeley. Bill replaces Margaret Meixner, who has departed for NASA's JPL.



SOFIA School

Registration is Now Open for SOFIA School, April 18-21, 2023

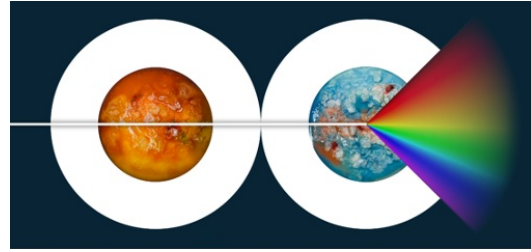
[Registration is now open](#) for the [second SOFIA School](#), which will be held this year on April 18-21, 7:30-11 am Pacific Time. This free virtual event is designed for anyone who considers using astronomical mid- and far-IR data in their scientific research. Through scientific-analysis and data-reduction examples paired with lectures on fundamental concepts, attendees will be introduced to the range of scientific information leveraged by such data on a variety of sources. The school will focus on SOFIA data, but the content presented will be relevant to other mid-/far-IR data from balloon facilities or satellites.

[Register here.](#)

Good to Know

Optical Constants Database is Online

The [Optical Constants database](#) (OCdb) website provides peer-reviewed published optical constants of organic refractory materials produced in the laboratory from ice and gas processing (ice and gas tholins) and optical constants of ices and ice mixtures relevant to astrophysical, planetary, and exoplanetary environments to facilitate both their access by the scientific community and their use for the scientific analysis of observational data returned by space missions and ground-based observatories. Optical constants are critical input parameters in models to simulate the absorption, reflection, and scattering of light due to organic refractory materials and ices in planetary and astrophysical environments and are key to the interpretation of observational data (planets, their satellites, exoplanets, asteroids, protoplanetary disks, etc.). The database includes optical constants data of ices, ice tholins, and gas tholins generated by several laboratories and covering a broad wavelength range from 0.27 to 200 μm . We invite the science community to contribute their published optical constants data sets to OCdb.



Astrophysics Data Analysis Program (ADAP)

On February 14, NASA released information on their [2023 Research Opportunities in Space and Earth Science \(ROSES\)](#) program. Of particular interest to researchers who wish to utilize the SOFIA archive for their science is the Astrophysics Data Analysis (ADAP) program. Through ADAP one can request funding for research if it is predominantly focused on data from a NASA mission that is presently publicly available via online archives. SOFIA qualifies as such a mission as does Spitzer, Herschel, 2MASS, WISE, and MSX, to name a few complementary infrared data archives listed in the solicitation. If you are interested in receiving funds for performing research on data from the SOFIA archive that you were not originally awarded, the ADAP program requires a Notice of Intent first (due March 31, 2023) followed by a proposal deadline of May 18, 2023.

Upcoming Events

Second PRIMA Workshop

The [Second PRIMA Community Workshop](#) will be held virtually on Tuesday-Wednesday, March 21-22, 2023, 11am-3pm Eastern Time, 16-20h CET. PRIMA is a concept for a space telescope mission in the far infrared (25-260 μm), to be submitted later this year to the NASA Announcement of Opportunity for an Astrophysics Probe Explorer (APEX) mission. Participants will have an opportunity to present their science case in a breakout session and a brief (2-3 pages) contribution with a due date in June. Your contribution, and others from the community, will be assembled into a PRIMA Science Book to be published on astro-ph arXiv in the fall. The goal is to highlight the rich diversity of research topics that the PRIMA GO Program will enable. Be sure to register to receive the Zoom connection information and further details. If you can't attend the Workshop but would like to contribute to the Science Book, please register anyway to receive these details.

Virtual Talks

Join Science Talks Remotely: Tele-Talks

Tele-Talks are scientific presentations given via phone, with slides distributed ahead of time. The talks are held approximately twice a month on Wednesdays at 9:00 a.m. Pacific, noon Eastern. For information on how to participate, check the [SOFIA Tele-Talk webpage](#).

Upcoming Tele-Talks

- March 15: Peter Barnes (SSI): magnetic fields and gas structures in the giant molecular cloud BYF73
- March 22: Yue Hu (University of Wisconsin); magnetic fields in Seyfert nuclei
- April 5: Darek Lis (NASA JPL); atomic oxygen abundance toward Sagittarius B2

Please direct questions and comments to the SOFIA Science Center help desk:
sofia_help@sofia.usra.edu.

