

# SOFIA

## Science Newsletter



February 2021

In this issue:

- Cycle 9 Proposals Selected
- Rock, Dust and Ice Workshop: March 23-26
- The Role of Magnetic Fields in the Galactic Center
- Archival Call for Proposals Due February 12
- Featured Public Archival Data: 30 Doradus
- SOFIA is Hiring Postdocs
- Join Science Talks Remotely

## Cycle 9

### Observing Proposals Selected for Cycle 9

The SOFIA Science Center is pleased to announce the selection of more than 120 observing programs for Cycle 9 (July 1, 2021 - September 30, 2022). Cycle 9 observations are planned to be distributed over 195 science flights, for a total of 820 observing hours, and with three deployments to the Southern Hemisphere. Selected proposals include:

- Joint observation programs with the Green Bank Telescope
- Programs that support JWST Early Release Science and Guaranteed Time Observations
- [A study of molecular water distribution across the sunlit lunar surface](#) (pilot legacy program)
- [Far-IR maps of the polarization field in the central 200 pc of the Milky Way](#) (pilot legacy program)
- [Characterization of magnetic fields in a large sample of galactic filaments](#) (legacy program)
- [A map of \[C II\] emission in the Southern Molecular Ridge of the Large Magellanic Cloud](#) (legacy program)

[See the full list of the accepted proposals.](#)

## Upcoming Events

### Rock, Dust and Ice: Interpreting Planetary Data -- March 23-26, 2021

How can we leverage multi-wavelength observations, radiative transfer theory and laboratory work to characterize planetary solids? This [4-day virtual workshop](#) on **March 23-26, 2021** (8-11 am Pacific Time) will bring together observers, modelers and laboratory astronomers to discuss the interpretation of observations of rocks, ices and dust on and around Solar System objects. A large variety of complementary observational techniques will be featured, via invited and contributed presentations, as well as different methods to

constrain solids' fundamental properties such as composition, porosity, thermal inertia and grain size distribution. Each daily session will include ample time for moderated interdisciplinary discussions. The fourth day will be dedicated to a moderated discussion on databases, archives and public codes.

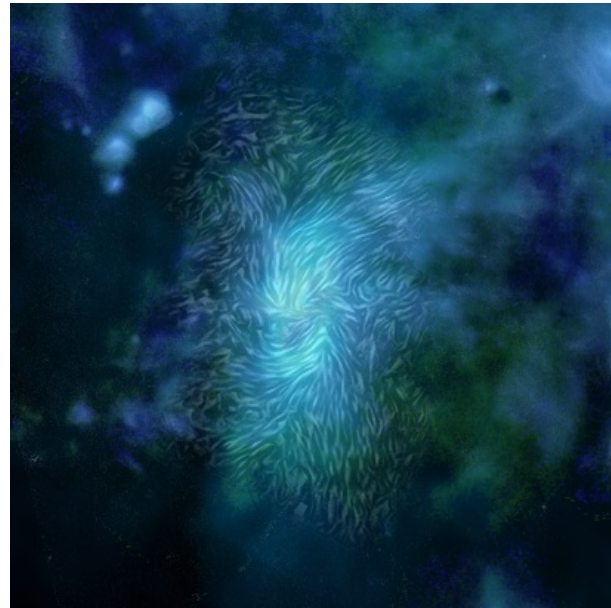
We solicit contributions for posters and short talks ([abstract submission deadline](#): March 9, 2021), and we welcome attendance from scientists at any career level, especially early career scientists. [Registration](#) is free but necessary to attend.

# Science Spotlight

## The Role of Magnetic Fields in the Galactic Center

Even though gravity dominates in the galactic center, there appear to be regions near the central black hole where the physics may be governed by the magnetic field. A strong magnetic field could suppress star formation, and it could keep the black hole from swallowing the matter it needs to form jets. SOFIA/HAWC+ polarization maps demonstrate that the magnetic field can be strong enough to control the material moving around the black hole, even in the presence of enormous gravitational forces. These results can help answer long-standing, fundamental questions about the galactic center region: why

the star formation rate is significantly lower than expected and why our galaxy's black hole is quieter than those in other galaxies. [Read more in the January 2021 edition of the Science Newsletter.](#)



A composite image of the central region of our Milky Way galaxy, known as Sagittarius A, with magnetic fields shown as streamlines. SOFIA data is shown in green (37 microns) and dark blue (25 and 53 microns). The light blue is from Herschel Space Observatory (70 microns) and the gray is from the Hubble Space Telescope. (NASA/SOFIA/L. Proudfit; ESA/Herschel; Hubble Space Telescope)

# Call for Proposals

## Archival Call for Proposals Due February 12

This program will fund archival research projects primarily using SOFIA data in the [Infrared Science Archive \(IRSA\)](#). Two distinct types of proposals for the archival research program are solicited:

- Regular Proposals - Large programs requesting up to \$150,000 per year, or more in exceptional cases, and lasting up to two years
- Small Proposals - Targeted programs requesting up to \$50,000 and lasting for one year

Updates were made in January to the Call for Proposals to clarify that a simple budget is required for Small Proposals and that an extra page is allowed for references.

Proposals are due **February 12** and are to be submitted using the [USPOT tool](#). Complete

# Featured Public Archival Data

## A Testbed for Starburst Activity: 30 Doradus

30 Doradus (the Tarantula nebula) is a very wide HII region which hosts strong starburst activity. At its center lies a large cluster of massive stars, which powers extended PDR regions. Thanks to its location in the LMC, it is one of the best laboratories to study how local conditions -- thermal, kinematic, density and magnetic fields -- support starburst activity.

Hydrogen density and temperature fields can be retraced through the emission from atomic and ionized tracers' lines (see [Chevance et al., 2020](#)), such as the wide [CII] and [OI] maps obtained with FIFI-LS (projects 75\_0016 and 05\_0100). The data also cover [NIII] and [OIII] transitions. In the densest regions, the effect of large optical depth makes the interpretation more uncertain -- using maps from isotopes such as [13CII] (GREAT, 83\_0610) can alleviate that issue.

High spectral resolution mapping is the most direct technique to determine the kinematic field. With a velocity resolution of  $\sim 1$  km/s, GREAT maps of the bright [CII] line (project 06\_0170) can be used to evaluate the contribution of stellar feedback to the whole region.

Finally, [large polarization maps](#) at 53, 89, 154, and 214  $\mu$ m (HAWC+, project 76\_0001) reveal the morphology of the magnetic field (see the corresponding [30Dor Cookbook recipe](#)). Emission at the shorter wavelengths traces hot dust from the densest compact regions with high spatial resolution ( $5''$  at 53  $\mu$ m).

All these datasets are publicly available from the [IRSA archive](#).

# Job Openings

## SOFIA is Hiring Postdocs

SOFIA is hiring research postdocs! Successful candidates may also spend up to 20% of their time supporting the operation of the SOFIA observatory.

The positions are awarded for a period of two years, with a possible third-year extension. Funding is available for travel to conferences, visiting collaborators, equipment, and publications. See the [position description and apply directly from here](#).

# Virtual Talks

## Join Science Talks Remotely: Colloquia & Tele-Talks

SOFIA colloquia are held via WebEx on Wednesdays at 3:30 pm Pacific. [See the complete schedule and connection information](#).

### Upcoming Colloquia

- February 10: Grant Tremblay (CfA)
- February 17: David Chuss (Villanova)
- February 24: Nicolas Lehner (Notre Dame)

[See full list of Spring Colloquia series.](#)

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**

- February 24: [C II] Mapping and CO-Dark Molecular Gas across the Galaxy NGC 6946; Frank Bigiel (University of Bonn)
- March 10: Magnetized Filamentary Gas Flows; Thushara Pillai (Boston University)

[See full list of tele-talks.](#)

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Please direct questions and comments to the SOFIA Science Center help desk:  
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