

SOFIA

Science Newsletter



January 2022

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SOFIA Conference

Our Galactic Ecosystem: Opportunities and Diagnostics in the Infrared and Beyond: February 28 - March 4, 2022 In-Person Conference

We are pleased to confirm that the SOFIA/ALMA sponsored conference “Our Galactic Ecosystem: Opportunities and Diagnostics in the Infrared and Beyond” at the UCLA Lake Arrowhead Lodge is going ahead, as planned, as an in-person event, with a **late registration deadline on Feb 14.**

While virtual meetings can be very valuable – as exemplified by the three well-attended SOFIA virtual workshops held over 2021 - we feel that they cannot fully replace in-person events. We are therefore, after significant consultation within the SOFIA Science Center, with the USRA and ALMA sponsors and with NASA, proceeding with the Lake Arrowhead meeting.

However, in consideration of the Covid-19 situation, we have adjusted both our meeting protocol and the timeline for registration and abstract submission.

We are reassured that the California caseload (as tracked by the [Johns Hopkins Coronavirus Resource Center](#)) is, as of Jan 18, coming down significantly, indicating that the situation will be significantly improved by late February.

We have defined a comprehensive Covid protocol which in addition to vaccination and masking requirements also now includes a requirement of a negative Covid-19 test before the participants leave their home. We will also have Covid tests available at the meeting site to test any participant showing potential symptoms of the disease. Our complete Covid-19 protocol [can be found here](#). U.S. residents can order [free test kits here](#).

Because of the uncertainty in these last few weeks, we are leaving the [registration](#) and [abstract submission](#) open for the meeting until the late registration deadline on Feb 14. The SOC is finalizing the conference program, and after this schedule has been filled all



new abstracts will be assigned to posters.

We thank you (invited speakers, registered participants and potential attendees) for your patience and we look forward to seeing you in the beautiful San Bernardino mountains.

Call for Proposals

Message from the Director of SOFIA Science Mission Operations: Cycle 10 is on!

I would like to remind you that the SOFIA Cycle 10 proposal deadline is next **Friday January 28**. All aspects of the [Cycle 10 Call for Proposals](#) remain valid. We are accepting Legacy proposals and General Observer proposals. Please contact the [help desk](#) with any technical questions.

I have received a number of questions regarding the Cycle 10 Call for Proposals because we have learned that NASA HQ is removing SOFIA from the Senior Review process this year. I want to reassure you that nothing changes for the Cycle 10 Call for Proposals and everything is proceeding as originally planned.

We look forward to seeing all of your important and exciting science proposals on January 28!

Warm Regards,

Margaret Meixner

Good to Know

SOFIA, Webb and the science before us

Webb is unfolded, in space! At the SOFIA Science Center, we have been following with excitement the [successful launch and deployment](#) of NASA's James Webb telescope. We are looking forward to supporting and enhancing Webb's discoveries, thanks to the unique complementarity offered by SOFIA's [instrument suite](#), in particular in wavelength coverage and resolution power, but also saturation limits. [This infographic](#) summarizes how the scope and operations of both facilities differ and together serve the community.

With this new major player in town, the specific and unique role of SOFIA for astronomy research clearly comes to light. Some of its main areas of scientific contributions are listed in this [traceability matrix](#), linking the strengths of SOFIA to one third of the Astro2020 Decadal report scientific priorities.

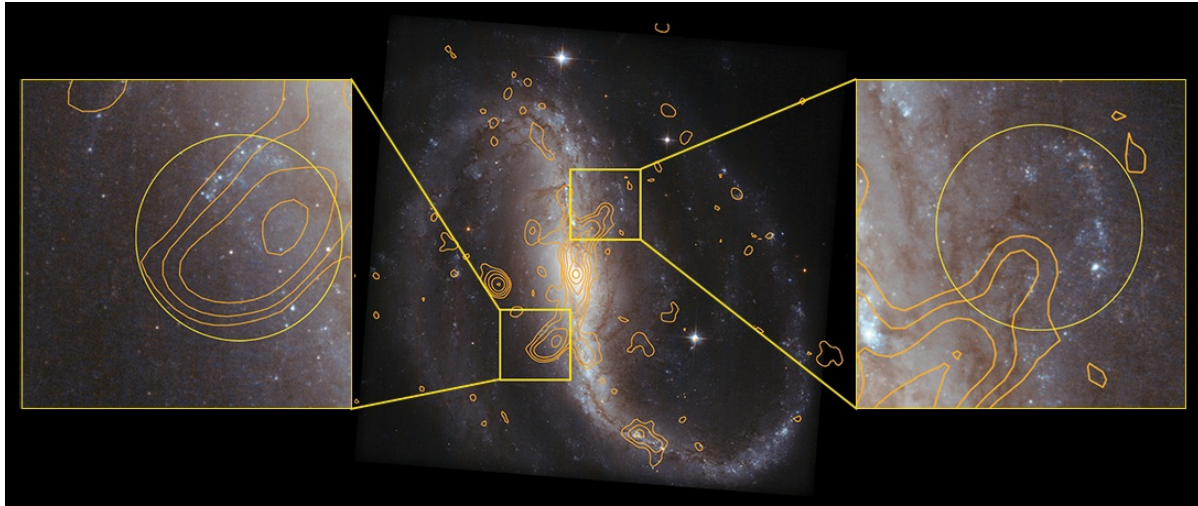
Science Spotlight

Evidence of [CII] Shocked Emission in NGC 7479

SOFIA observations of the barred spiral galaxy, NGC 7479, were able to separate shock-enhanced ionized carbon [CII] emission from that associated with star formation, reminding us that it is important to consider multiple mechanisms when studying the [CII] emission in galaxies with active nuclei.

SOFIA observed the entire bar and counter-arm structure of NGC 7479 with the Far

Infrared Field-Imaging Line Spectrometer (FIFI-LS) to study the distribution and intensity of the [CII] line at 157.7 μ m. This is the first complete [CII] observation of a galaxy bar ever done. The SOFIA study concludes that most of the [CII] emission comes from the molecular gas along the bar. However, the emission from the ends of the counter-arm structure is more complex. [Read more.](#)



The Hubble Space Telescope image of NGC 7479 created from observations at visible and near-infrared wavelengths with 20 cm radio continuum contours in yellow (middle panel). The boxes highlight the ends of the lower and upper counter-arms; expanded versions of these regions are shown in the lateral panels where the circles depict the FIFI-LS aperture. (ESA/Hubble & NASA)

SOFIA Winter Meeting

SOFIA Virtual Meeting Events

Following the cancellation of the AAS Winter meeting, we were able to successfully engage the community with a program of online events -- recordings and materials are now available online.

SOFIA Town Hall

SOFIA Director Margaret Meixner and the SOFIA team reported on the status of the observatory, the ongoing Cycle 9 observations including Legacy Programs, the open Cycle 10 Call for Proposals, upcoming community events, as well as the timeline for instrument upgrades and developments.

Special Session: The extreme ISM in the inner 200 pc of the Galaxy

The central 200pc of the Milky Way shows high densities, radiation field, cosmic ray fluxes as well as strong magnetic fields, which may explain the high rate and special characteristics of galactic center star formation. Several new data sets and observatories have recently given improved insights into the gas, dust, and magnetic field, including SOFIA, ALMA, and MeerKat observations. This session presented some of this new data on the exciting characteristics of the extreme ISM in the central 200 pc.

SOFIA Open Calls for Proposals: what you need to know

The purpose of this event was to provide practical information to both experienced and prospective SOFIA users on how to best design a scientifically and technically strong SOFIA proposal for Cycle 10. The offered observational capabilities and their connection to science cases, the different proposal types, as well as the associated funding opportunities are described.

Best SOFIA thesis: The formation and dispersal of dense gas in star forming regions

by Lars Bonne (SOFIA/USRA)

Featured Public Archival Data

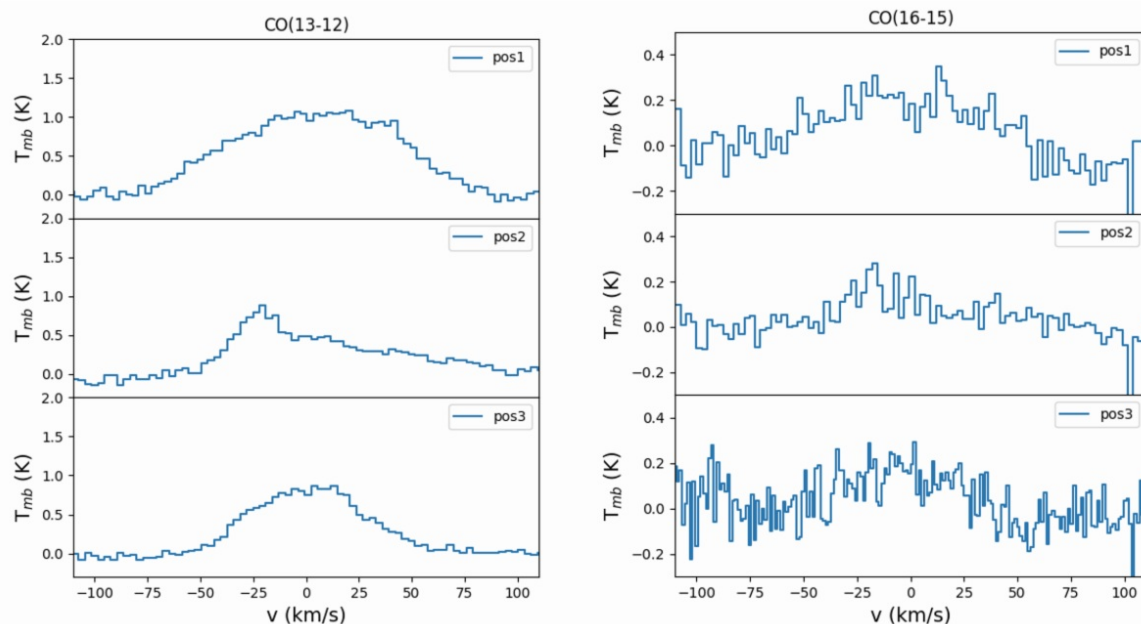
CO Excitation across the Circumnuclear Disk

The Milky Way Galactic center (GC) is the only laboratory in which we can spatially resolve the gas components and separate the physical processes that take place in galactic centers. The molecular gas of the GC is distributed in a torus structure, the circumnuclear disk (CND). A complete sample of CO J-transitions, from low-J transitions (e.g. J=2-1) to the high-J transition accessible only with GREAT (e.g. J=16-15), allows for the separation of different gas components, and for the identification and analysis of the physical properties and excitation processes present in the CND.

Requena-Torries et al. 2012 studied the CO excitation towards the northern and southern lobes of the CND, collecting CO transitions from low-J (IRAM data) up to the J=13-12 and J=16-15 (SOFIA/GREAT data). The authors showed that the CO spectral line energy distribution (SED) of these two positions need at least two gas components to be fitted, each of them with different physical properties. The high-J transitions have been fundamental to identify and characterize the two components.

The CO J=16-15 and J=13-12 spectra of three additional positions, with increasing galactocentric radius, have been observed with GREAT as part of project 01_0160. The analysis of these three positions could reveal the excitation gradient of the gas across the CND, and how the physical properties of the gas components and the local heating processes vary as a function of Galactocentric radius.

All data is available in the [IRSA archive](#).



CO(13-12) spectra (left) and CO(16-15) spectra (right) towards the 3 positions observed with GREAT.

SOFIA School: February 2-4, 2022

This free virtual event is designed for anyone who uses or considers using mid- and far-IR data in their research. Through short lectures based on existing data and scientific results, attendees will be introduced to many of the scientific cases leveraged by such data. Detailed presentations on data analysis considerations specific to this wavelength range, such as atmospheric transmission correction, will be included. Practical examples on how to derive physical and chemical characterization of astronomical sources will be presented by authors of SOFIA papers. We encourage participation from astronomers at any career level: please look at the published schedule register on the [School website](#).

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 am Pacific, noon Eastern. For information on how to participate, check the [SOFIA Tele-Talk webpage](#).

Upcoming Tele-Talks

- January 26: Ronan Higgins (University of Cologne); Large Scale Spectral Mapping
- February 9: Luigi Spinoglio (INAF Istituto di Astrofisica e Planetologia Spaziali); Galactic Metallicity from FIR Fine Structure Line Measurements
- February 16: Dennis Lee (Northwestern University); Magnetic Field and Cloud Structure in L1688
- March 9: Jessica Sutter (SOFIA Science Center); [CII] Mapping of NGC7331
- March 23: Nicola Schneider (University of Cologne); [CII] in Tracing Colliding Flows

[See full list of Tele-Talks.](#)

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

