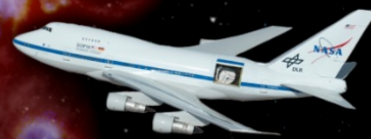


SOFIA

Science Newsletter



September 2021

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Science Spotlight



The Age of Westerlund 1 Revisited

Westerlund 1 is a nearby Milky Way cluster, the only known analogue to the bright clusters seen in metal rich starburst galaxies where all of the individual stars can be resolved. Provided its age can be determined, Westerlund 1 could be an ideal benchmark system for studies of more distant, high-redshift starburst galaxies. Westerlund 1 also contains extreme stellar diversity, hosting a large variety of massive stars.

SOFIA FORCAST imaged Westerlund 1 in the wavelength range of 5.6-31.5 microns, covering a crucial portion of the spectral energy distribution where a large proportion of flux is emitted. Accessing wavelengths longer than 10 micron ensures any optical light lost to circumstellar extinction is captured when it is re-emitted at longer wavelengths. Comparing the cool supergiants to stellar isochrones implies they are consistent with an age of 10 Myr, and ages of less than 6 Myr are excluded at the 99.9% confidence level. It is likely Westerlund 1 is not a coeval starburst cluster, but the product of a prolonged period of star formation lasting roughly 5 Myr. [Read more.](#)



Image of young star cluster Westerlund 1 taken by the Hubble Space Telescope toward the southern constellation of the Altar. Westerlund 1 is home to some of the largest and most massive stars known, including four red supergiants, six yellow hypergiant stars, 24 Wolf-Rayet stars, and several more unusual stars that continue to be studied. *Credit: ESA/Hubble & NASA*



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.



The school is organized by the SOFIA Science Center and will focus on SOFIA data, but can be relevant to other mid/far IR data, from balloon facilities or satellite data. We encourage participation from astronomers at any career level: please register on the [School website](#).



Our Galactic Ecosystem: Opportunities and Diagnostics in the Infrared and Beyond

February 28 - March 4, 2022
UCLA Lake Arrowhead Lodge, CA

The far infrared (FIR) contains critical information about galactic ecosystems; the circle of life of stars and planets. The initiation of interstellar chemistry -- via light hydrides - is preferentially probed at FIR/THz wavelength. What is the role of feedback (from young and old stars) on the interstellar medium (ISM)? How does the role of magnetic fields affect the evolution of the ISM and star formation? SOFIA provides a flexible, and is currently the only general access to the far infrared (30-300 μm) and its tracers of atomic and molecular lines and FIR polarization. Especially in synergy with the high resolution and sensitivity of the ALMA array this wavelength range provides critical access to our Galactic ecosystem and its workings. This conference will allow in-person discussions of the results and future opportunities in studying galactic ecosystems with FIR and sub-mm wave methods, using SOFIA, ALMA and other platforms. A specific goal is to explore synergy between observatories, including SOFIA, ALMA, JWST, and with theory. Registration is now open on the [conference website](#). Registration fees include room and board at the UCLA Lake Arrowhead Lodge, in the majestic mountains of the San Bernardino National Forest.



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SAVE THE DATE FOR THIS IN-PERSON CONFERENCE!

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More information coming soon:
<https://www.sofia.usra.edu/Arrowhead2022>

Upcoming Events

SOFIA at DPS: Webinar on October 4, 2021

Attendees of the upcoming [53rd Annual DPS Meeting](#) will be able to attend the webinar: 'SOFIA: Data and Resources for Planetary Science', hosted at the USRA booth on **October 4th, at 10:30 am Pacific Time**. SOFIA is the only facility which can access the 5-600 microns wavelength range at a variety of spectral resolutions. Well suited to target thermal emission from solar system bodies, SOFIA already observed a variety of asteroids, moons and planets. This webinar will introduce publicly available data, the next observing and funding opportunities, and the outcome of the recent '[Rocks, Ice and Dust: Interpreting Planetary Data](#)' workshop.

The Future of Airborne IR/submm Astronomy - Instrument Solutions: November 17-19, 2021

This online workshop will discuss technological options for new Infrared/Submm instrumentation. The focus will be on devices carried by airborne platforms that can be built within the next decade by European institutions, in order to fill the large gap for the astronomical community, until new space observatories for these wavelengths become available again. It is the second of two workshops, where the [first, held in July 2021](#), provided the scientific priorities of European Infrared/Submm astronomy with a clear need for continuing observational capabilities at these wavelengths. More details are available at the [workshop homepage](#).

Featured Public Archival Data

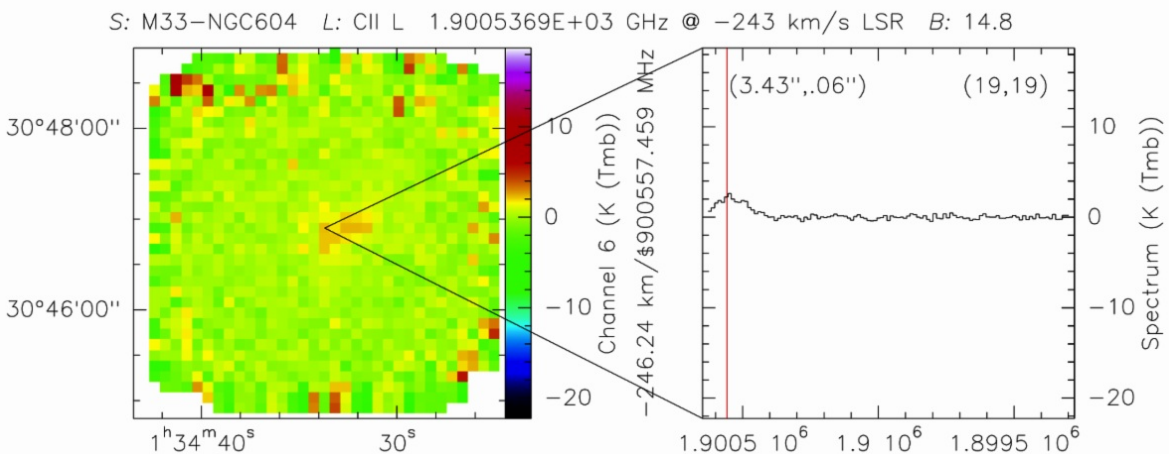
Velocity Resolved [CII] and [NII] Maps of Select HII Regions in M33

Measurements of far infrared cooling lines are ideal tools for studying the interstellar

medium. The brightest of these cooling lines is often the 158 micron line from singly-ionized carbon, or the [CII] 158 μm line, This emission line can originate in a wide variety of ISM environments, which complicates the utility of [CII] as an indicator of ISM properties.

The origins of the [CII] emission can be further probed by comparing the strength of the [CII] emission to the emission from singly ionized nitrogen at 205 μm . The ratio of these two lines can be used to estimate the fraction of [CII] 158 μm emission arising in phases of the ISM where hydrogen is ionized, like HII regions surrounding young stars.

Spatially resolved maps of the [CII] 158 μm and [NII] 205 μm lines in four HII regions in M33 obtained using GREAT are available on the [IRSA SOFIA Archive](#) (projects 03_0005 and 04_0038). Project 03_0005 contains [CII] 158 μm and [NII] 205 μm maps for HII regions NGC592, NGC595 and NGC604, while Project 04_0038 contains maps of NGC558 and additional maps of NGC604.



[CII] map of HII region NGC604 in M33

Observatory News

SOFIA's Response to AAS's New Open Access Journals Policy

The American Astronomical Society (AAS) recently [announced plans](#) to make their journal publications Open Access on January 1, 2022. The removal of subscription rates and paywalls for AAS journals will result in [higher publication charge rates](#) for authors. As a result, SOFIA PIs with current grant awards that have a period of performance that goes beyond January 1, 2022, should plan to take the following steps as necessary:

- PIs can ask for a discount on their publication fees through AAS's extended waiver program (<https://journals.aas.org/oa/>);
- If AAS waivers are not obtained, PIs may request an increase of their SOFIA budgets to cover any gaps in funding publication costs. These requests should be submitted to the USRA Contracts and Grants Manager, Evelyn Monroy, at emonroy@usra.edu. These requests will be considered on a case-by-case basis and should be submitted with a short justification statement.

Honoring Abe Cheng

SOFIA's valued team member, Abe Cheng, has been honored with a Main-Belt asteroid naming, now designated 419858 Abecheng. This naming has been approved by the IAU and is an official designation.

Abe Cheng was a dedicated SOFIA team member on



deployment in Germany with the team earlier this year when he died suddenly. His keen attention to the SOFIA IT systems was unparalleled and his service was regarded as that of the highest caliber.

Virtual Talks

Join Science Talks Remotely: Colloquia and Tele-Talks

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

Upcoming Colloquia

- October 6: Matthew Hankins (Arkansas Tech)
- October 13: Gregory Sloan (STScI)
- October 20: Tucker Jones (UC Davis)
- October 27: Nick Scoville (Caltech)

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

- September 29: Christian Fischer and Christof Iserlohe (Deutsche SOFIA Institut); Atmospheric Precipitable Water Vapor from SOFIA
- October 13: Andy Harris (University of Maryland); [CII] in Sgr B
- October 26: Skarleth Motiño Flores (Catholic University); Local Analogs to High Redshift Galaxies
- November 3: Elizabeth Tarantino (University of Maryland); [CII] in M101 and NGC6946

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

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

