SOFIA Science Newsletter

October 2021

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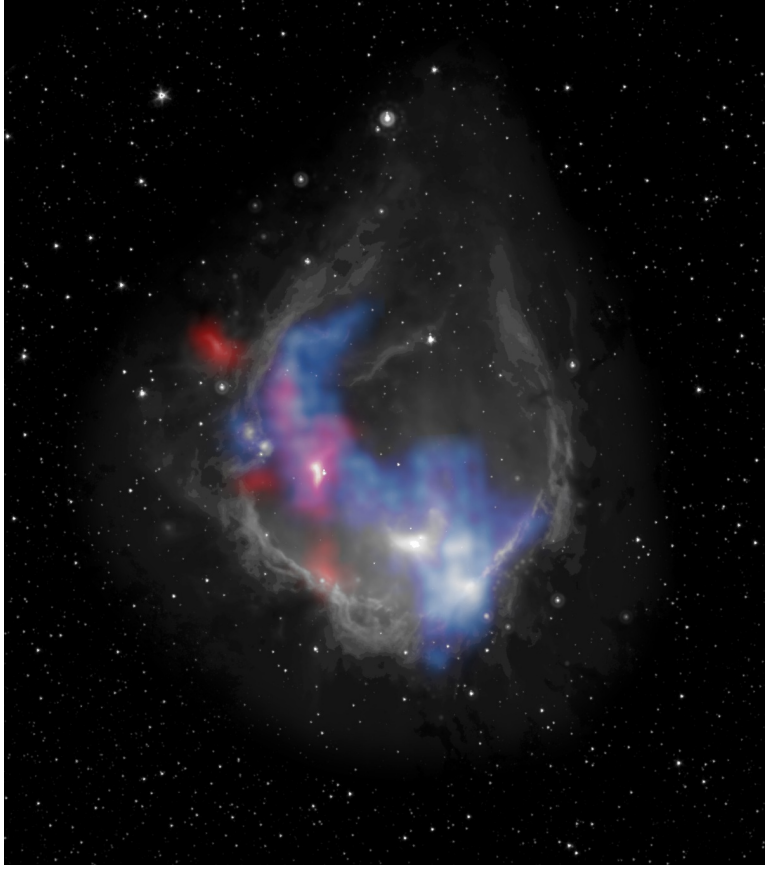
Science Spotlight

Stellar Feedback and Triggered Star Formation in RCW 120

Recent SOFIA observations show that the high-mass star-forming region RCW 120 is expanding extremely fast. The rapid expansion causes molecular material at the outskirts of the region to pile up and be compressed, which leads to the formation of new stars around the region. While this process – known as positive stellar feedback – has been studied in a variety of environments, these new observations demonstrate for the first time that this type of feedback can operate on very short timescales, potentially shedding light on the star formation history of the universe. Read more.



Composite image of the nebula RCW 120. The ring-shaped clouds around the nebula were detected by the Spitzer Space Telescope. SOFIA measured the glowing gas shown in red and blue to study the nebula's expansion speed and determine its age. The blue gas represents gas expanding in the direction toward Earth and the red away from Earth. The expansion is triggering the birth of stellar neighbors at breakneck speeds – and revealing the nebula is younger than previously believed. Credit: NASA/JPL-Caltech/SOFIA

Evolved Stars Workshop

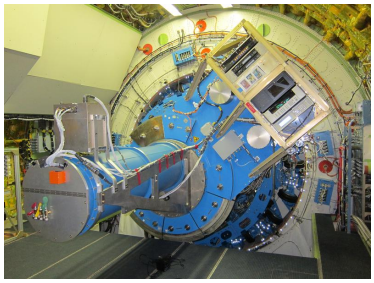
Registration Open for 'Evolved Stars and their Circumstellar Environments' Workshop December 14-17, 2021

The upcoming online workshop 'Evolved Stars and their Circumstellar Environments', happening on **December 14-17**, will be an exciting platform for discussions about the current main questions in the field of evolved stars, and the next observational opportunities. The event will explore how theoretical and observational studies of evolved stellar objects can contribute to the understanding of a critical part of stellar evolution. It will feature discussions on synergies between infrared observations and other techniques, and how laboratory work can contribute to the advancement of the field. Invited talks by J. Cernicharo, C. Kemper, H. Linnarz, G. Sloan and L. Ziurys are confirmed.

We encourage community members to submit an abstract for a contributed talk (**submission deadline is November 22nd**). There is no registration deadline or fee, and we strongly support participation from all interested scientists, in particular early-career.

Observatory News

EXES Becomes Facility Instrument



On October 1st, 2021, the Echelon-Cross- Echelle Spectrograph instrument onboard SOFIA (EXES) became a facility science instrument, joining FORCAST, HAWC+ and FIFI-LS. EXES has demonstrated its performance on SOFIA for many years as a PI-led instrument, has completed commissioning, and has a mature data reduction pipeline.The transition from a PI-led instrument to a facility science instrument was initiated with the goal of expanding EXES community to maximize the scientific potential and impact of the instrument.

New Public Data Pipeline: FLITECAM

We are pleased to announce that the FLITECAM pipeline is now available to the public. This new and improved pipeline will allow users to reprocess archival FLITECAM data and better understand FLITECAM's science products. The pipeline software and its documentation are available through SOFIA's GitHub repository. Additional information, including user manuals and step-by-step tutorials for FLITECAM's imaging and grism modes, can be found on our Data Pipelines web page.

New SOFIA Archive at IRSA release

The fourth release of the SOFIA Archive at IRSA SOFIA Archive at IRSA adds science and abstract keyword search capability, improved visualization for spectral cubes, and quality assurance comments for SOFIA data products.This update includes keyword and abstract search capability, the display of quality assurance information for data products, and enhanced data cube visualization.

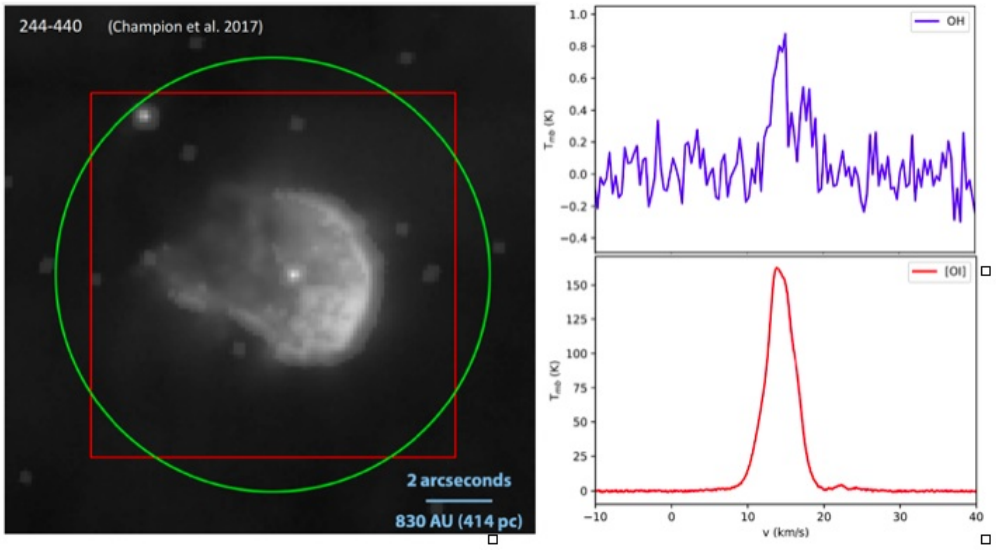
Featured Public Archival Data

Proplyds of Orion - [OI] and OH

The majority of stars form in very active star forming regions where feedback from the most massive stars can photo-evaporate the disk of accreting young stellar objects (YSOs), so called proplyds, and thus affect the ongoing star formation. The exact impact of irradiation on proplyds thus has to be studied to understand how it limits mass accretion in these objects.

SOFIA observations with GREAT provided spectrally resolved (~0.2 km/s) maps of [OI] at 63 μm and OH at 163 μm, towards three proplyds in Orion: HST 10, 244-440 and the Beehive. Note that the high spectral resolution of the [OI] observations allows to separate the disk and jet in the proplyds. Those three sources had also been observed in CII] and several high-J CO lines with Herschel (Champion et al. 2017). The SOFIA data provides the complementary line observations necessary to constrain the heated gas in these proplyds using PDR and shock models.

All the SOFIA data for the proplyds can be found in the SOFIA science archive at IRSA under program ID 03_0138. This program also covers the large Carina proplyd at 2.3 kpc in [OI] and CO(16-15).



(Left) HST Hα image of the 244-440 proplyd in Orion (adapted from Champion et al. 2017). (Right) The GREAT spectra of OH and [OI] towards the 244-4

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 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

- 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.

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 register on the School website.

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

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.

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