July 2019

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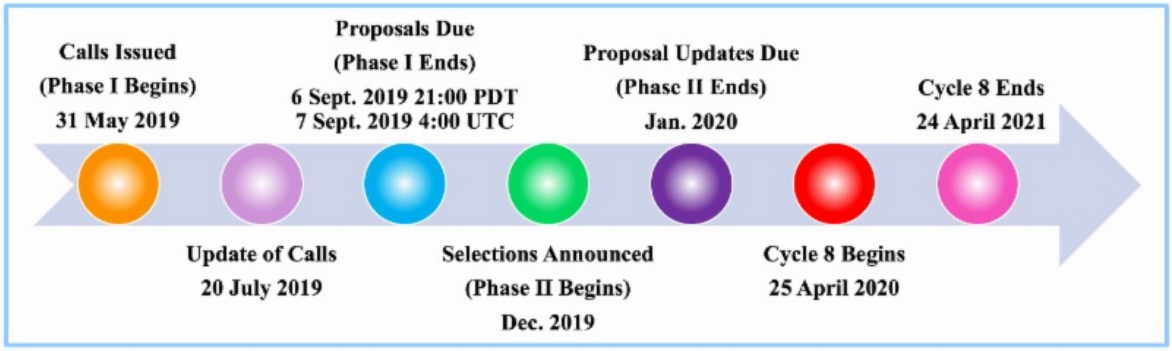
Cycle 8 Calls for Proposals



New for Cycle 8:

- More and larger Legacy projects are encouraged
- Introduction of a pilot archival research program—the SOFIA Archival Research Program (SARP)—with $300k of funding
- Faster mapping modes for the High-resolution Airborne Wideband Camera Plus (HAWC+) and Faint Object infraRed CAmera for the SOFIA Telescope (FORCAST) instruments

Two Cycle 8 Calls for Proposals were issued on May 31, 2019 for the community of astronomers worldwide: one for regular proposals, and one for both Legacy Program proposals and the new Archival Research Program proposals. Visit the Cycle 8 webpage to read more about the calls and view important updates for Cycle 8, the latest of which was a modification made on June 10, 2019, to the maximum available hours for the Calls.

Scientists interested in submitting proposals for Cycle 8 are encouraged to contact the Help-Desk *well before* the proposal deadline (September 6, 2019, 21:00 PDT) with any questions about planning observations, submitting proposals, or troubleshooting any issues related to the proposal submission process.

On Friday, August 9, 2019, SOFIA Science on Tour will conclude with a proposal tool webinar, where participants will be led through guided examples and have the opportunity to ask questions live while learning how to use SOFIA's tools to submit

proposals. More information coming soon.

SOFIA at the June American Astronomical Society Meeting

SOFIA featured three science posters and one talk at the 234th American Astronomical Society Meeting held June 9-13, 2019 in St. Louis, Missouri. Additionally, C. Darren Dowell (Jet Propulsion Laboratory) presented SOFIA HAWC+ results at the "Spiral Galaxies Near and Far" press conference. SOFIA's latest print newsletter was also released during the meeting. SOFIA-related posters and iPosters displayed at previous meetings can be found on the SOFIA Science Posters webpage.

(Above right) SOFIA HAWC+ results presented by C. Darren Dowell: Streamlines showing magnetic fields layered over a color image of the dusty ring around the Milky Way's massive black hole. The white Y-shaped structure is warm material falling toward the black hole, which is located near where the two arms of the Y-intersect. The streamlines reveal that the magnetic field closely follows the shape of the dusty structure. Each of the blue arms has its own field that is totally distinct from the rest of the ring, shown in pink. Credit: Galactic Center dust and magnetic fields: NASA/SOFIA, star field image: NASA/Hubble Space Telescope

Posters

108.03 **The SOFIA-FORCAST Imaging Survey Toward Giant HII Regions of the Galaxy**, Lim et al.
FORCAST 20- and 37-micron imaging survey toward Giant HII regions of Milky Way to study the formation mechanisms of massive young stellar objects. Also utilizes archival data from near-infrared to centimeter wavelength regimes to analyze the physical properties and relative formation histories of individual proto-stars as well as the proto-clusters. View the iPoster here.

208.04 **Recent Scientific Highlights from the Stratospheric Observatory for Infrared Astronomy (SOFIA)**, Moullet & Klein
This poster showcased the most recent high-profile SOFIA-enabled scientific results, focusing on dust imaging and polarimetry in nearby active galaxies, supernovae remnants, and galactic star-forming regions. Also includes information on the future contribution of SOFIA's latest instrument, the HIgh Resolution Mid-infrarEd Spectrometer (HIRMES), to study the mass and composition (including ice and gas-phase water content) of protoplanetary disks. View the iPoster here.

208.05 **Absolute flux Calibration and Characterization of the SOFIA FIFI-LS Integral Field Spectrometer**, Fadda et al.
Presents the absolute flux calibration and characterization of the Far Infrared Field-Imaging Line Spectrometer (FIFI-LS) using recent observations made in the laboratory with an internal calibrator and observations of planets, moons, and asteroids as absolute flux calibrators. View the iPoster here.

Talks

316.05 **The Spiral Magnetic Field in the Central 5 Parsecs of the Galaxy**, Dowell et al.
HAWC+ 53-micron observations of the polarization and inferred magnetic field structure of the Circumnuclear Ring, which demarcates the inner boundary of the molecular gas that is likely spiraling in toward the supermassive black hole at the center of the Milky Way. Discussion of estimates of the magnetic field strength from the 53-micron data, the relationship of these data to observations at shorter and longer far-infrared wavelengths, and interpretation of several of the magnetic features observed.

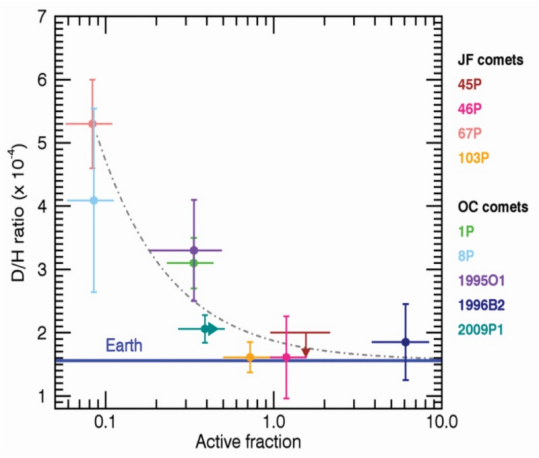
Kia Ora: New Zealand Welcomes SOFIA

SOFIA touched down in Christchurch, New Zealand on June 2nd, 2019, to commence its annual Southern hemisphere observations. Observing from New Zealand allows SOFIA to study celestial objects and events that often can only be seen in the Southern Hemisphere. SOFIA will remain in New Zealand through the end of July, utilizing the instruments German REceiver for Astronomy at Terahertz Frequencies (GREAT), FORCAST, and HAWC+. Current flight plans are available here, including those for the first of SOFIA's Legacy Program proposals: Constraining Recent Star Formation in the Galactic Center: A SOFIA/FORCAST Legacy Program (Hankins, Proposal ID 07_0189) and Radiative and Mechanical Feedback in Regions of Massive Star Formation (Tielens, Proposal ID 07_0077).

SOFIA Observations Fuel Debate about the Origin of the Earth's Oceans

"Terrestrial Deuterium-to-Hydrogen Ratio in Water in Hyperactive Comets"
Lis, et al., 2019, A&A, 625, L5.
Read the paper here.

The deuterium/hydrogen (D/H) ratio derived from observations of comets is essential to obtaining key constraints of the origin of water molecules on Earth. Currently there are two suggested solutions: (1) that water was externally delivered via comets or asteroids to the terrestrial planets, which were too hot to maintain their own water ice during accretion, or (2) that water was preserved during accretion in olivine grains or through the oxidation of an early hydrogen atmosphere by FeO in the terrestrial



The D/H ratio in cometary water as a function of the active fraction. The blue horizontal line corresponds to the Earth's ocean value. The dashed-dotted line shows the expected ratio assuming two sources of water: D-rich (3.5×terrestrial) from the nucleus and terrestrial. Credit: Lis et al.

magma ocean.

D/H ratios have shown to be highly variable in comets, reflecting the environment in which they formed. Hyperactive comets, such as 46P/Wirtanen, emit large amounts of water molecules relative to their nucleus size because of the sublimation of water-ice-rich particles within the coma, and are thus excellent laboratories for studying D/H ratios. This recent SOFIA publication (Lis, et al. 2019) reports findings based on the analysis of data collected during observations of 46P/Wirtanen using the GREAT spectrometer, yielding a derived D/H ratio of ~1.6×10^{-4} which is the same as in the Earth's oceans.

Read more here.

Upcoming Tele-Talks

SOFIA Tele-Talks are scientific presentations given via phone, with slides distributed ahead of time. The talks are targeted broadly towards members of the astronomy community who are interested in SOFIA science and in the current and potential scientific capabilities of the observatory. The talks are organized by Dan Lester (Univ. of Texas, Austin) and held approximately twice a month on Wednesdays at 9:00am Pacific, noon Eastern.

For information on how to participate in the Tele-Talks, please check the SOFIA Tele-Talk page.

The next Tele-Talks are:

- July 17: Maggie Thompson (UCSC); MidIR debris disk around BD+20 307
- August 7: Allison Towner (University of Virgnia, NRAO); photometry of Extended Green Objects
- August 14: Loren Anderson (West Virginia Univ); [C II] 158 μm toward S235
- September 4: Hal Yorke (Director of SOFIA SMO); SOMER and FMR project reviews
- September 18: Fabio Santos (MPIfA); FIR polarization in Rho Oph A
- October 2: Jeonghee Rho (SETI Institute); OIII and OI in CasA knots

The SOFIA Instrument Suite

The Stratospheric Observatory for Infrared Astronomy (SOFIA) features an airborne platform hosting the following instrument suite available for use by the community of astronomers worldwide:

EXES: Echelon-Cross- Echelle Spectrograph *(4.5 – 28.3 μm)*
FIFI-LS: Far Infrared Field-Imaging Line Spectrometer *(51 – 200 μm)*
FORCAST: Faint Object infraRed CAmera for the SOFIA Telescope *(5 – 40 μm)*
FPI+: Focal Plane Imager Plus *(0.36 – 1.1 μm)*
GREAT: German REceiver for Astronomy at Terahertz Frequencies *(0.490 – 4.747 THz)*
HAWC+: High-resolution Airborne Wideband Camera Plus *(50 – 240 μm)*
HIRMES: HIgh Resolution Mid-infrarEd Spectrometer *(25 – 122 μm)*

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Editor: Randolf Klein
Content: Raquel Destefano
Design: Leslie Proudfit

Please feel free to direct questions and comments to the

SOFIA Science Center Help-Desk: sofia_help@sofia.usra.edu.