

Opportunity Title: Subsystems development for the Astrophysics Stratospheric Telescope for High Spectral Resolution Observations at Submillimeter-wavelengths

Opportunity Reference Code: 0197-NPP-NOV23-JPL-Astrophys

Organization

National Aeronautics and Space Administration (NASA)

Reference Code

0197-NPP-NOV23-JPL-Astrophys

Application Deadline

11/1/2023 6:00:59 PM Eastern Time Zone

Description

The Astrophysics Stratospheric Telescope for High Spectral Resolution Observations at Submillimeter-wavelengths, ASTHROS, is a 2.5-m balloon-borne observatory featuring cryogenic superconducting heterodyne array spectrometers that will make the first detailed spectrally resolved high spatial resolution 3D map of ionized gas in Galactic and extra-galactic star forming regions via simultaneous observations of the 2.46 THz 1.46 THz fine structure lines of ionized nitrogen. A 21-day Antarctic flight in 2023 will focus on mapping Galactic and extragalactic star forming regions. ASTHROS goal is to understand how different stellar feedback mechanisms affect ionized gas over a wide range of spatial scales in the Milky Way and other galaxies. We are seeking postdoctoral researchers to assist in all phases of the design, fabrication, I&T and flight preparation of the different components and systems of the ASTHROS terahertz radio-telescope. In particular, candidates who can work well in a very dynamic team of scientists and engineers, under a tight schedule, and with experience/interested in one or more of the following areas: (i) RF control electronics & software (instrument computers and software, data transmission protocols), FPGAs, DC-DC converters, etc) to develop custom compact Command & Data Handling (C&DH) systems tailored to terahertz systems able to power and control the different subsystems, analog and digital, as well as acquiring both science and housekeeping data. The system should also be able to interact with standard data transmission protocols; (ii) Integration and laboratory characterization of high-frequency (terahertz) components and subsystems such local oscillators (frequency multiplied Schottky diode based sources) and mixers (cryogenically-cooled Hot Electron Bolometer mixers), (iii) I&T of submillimeter-wave/terahertz instruments and/or balloon-borne instruments/telescopes; (iv) mechanical and thermal design knowledge

References:

[1] J. V. Siles, "Exploring the Universe: From Antarctica to the Stars", as part of the JPL Von Karman Lecture Series "The World of Scientific Balloons", Feb. 2019. Available online at: <https://youtu.be/18zr9sMuhlk> and aired on NASA TV. [2] T. Phillips et al., Submillimeter astronomy (heterodyne spectroscopy), Proc. of the IEEE, Nov. 1992. [3] P.H. Siegel, "THz Technology," IEEE Trans. Microwave Theory and Techniques 50th Anniversary Issue, vol. 50, no. 3, pp. 910-928, March 2002. Special Invited paper. [4] Jose V. Siles, et al., "A New Generation of Room-Temperature Broadband Frequency Multiplied LO Sources with 10 times Higher Output Power in the 160 GHz - 1.6 THz Range", IEEE Transactions on Space Terahertz Technology, in press, November 2018.

Location:

Jet Propulsion Laboratory
Pasadena, California

Field of Science: Astrophysics

Advisors:

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Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found at: <https://www.nasa.gov/oiir/export-control>.

Eligibility is currently open to:

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- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

Eligibility Requirements

- **Degree:** Doctoral Degree.

NPP

NASA Postdoctoral Program

 ORAU Pathfinder

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