

Opportunity Title: Multipixel Receiver Systems for Terahertz Astronomy

Opportunity Reference Code: 0067-NPP-NOV23-JPL-Astrophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0067-NPP-NOV23-JPL-Astrophys

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

Description Future science instruments for Stratospheric Observatory for Infrared Astronomy (SOFIA) aircraft and long-duration-balloon missions like Stratospheric Terahertz Observatory (STO) will require high-performance superconducting heterodyne array receivers. For these platforms a key consideration is to increase mapping speed in order to maximize the science return using the time available in flight. Two approaches to improving mapping speed are increasing the pixel count and improving the sensitivity. We seek ways to efficiently do both. Challenges include local-oscillator generation and distribution at these high frequencies, optimizing receiver architecture/topology, and investigate ways to tune the device material parameters to minimize noise temperature consistently. For the generation of local-oscillator power, we are considering approaches involving frequency multiplier chains utilized Schottky diodes and quantum cascade lasers, which are multiplexed using waveguide networks, phase gratings, or a combination of both. We are interested in developing a method to build array receivers based on balanced mixers. We are currently working on modest array receivers, and wish to incorporate the technology developed to take a significant leap in terms system performance.

Location:

Jet Propulsion Laboratory
Pasadena, California

Field of Science:Astrophysics

Advisors:

Jonathan Kawamura
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818-393-4779

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/oiiir/export-control>.

Eligibility is currently open to:

- 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



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Eligibility Requirements • **Degree:** Doctoral Degree.