

**Opportunity Title:** Development of Solar Blind UV Photodetectors and Photocathodes Using III-Nitride Material

**Opportunity Reference Code:** 0064-NPP-NOV23-JPL-TechDev

**Organization** National Aeronautics and Space Administration (NASA)

**Reference Code** 0064-NPP-NOV23-JPL-TechDev

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

**Description** We are currently developing an all solid-state photon counting detector to operate in solar blind ultraviolet range using a new III-N avalanche photodiode (APD) array technology. Compared to the current state-of-the-art in flight-ready microchannel plate (MCP) sealed tubes, this Solar-blind Ultraviolet Avalanche (SUAV) detector array technology will increase the QE by at least a factor of 5 and significantly enhance both fabrication yield and reliability. Since it is solid state, it does not require high voltage, and it does not require a photocathode that requires cesium or other highly reactive material for activation. Furthermore, due to wide bandgap of the material, the operating temperature of the detector is higher than more conventional silicon detectors and it is more radiation tolerant. These performance improvements and system simplifications will enable a ~4 meter medium class ultraviolet (UV) spectroscopic and imaging mission that is of the highest scientific priority for NASA.

The detector array under development uses our innovative growth techniques to reduce the defects in the material that are associated with high noise, breakdown, and low QE. We will combine our high quality material, with robust avalanche photodiode (APD) design for reduced noise operation, with our unique III-N processing technology and substrate removal, to optimize the efficiency, noise, and uniformity of the APD arrays. We are also developing other III-N FPAs and photocathodes.

Successful candidate will develop processing, fabrication, and characterization techniques in various projects for solar blind UV detectors and particle detectors supported by NASA and DoD. Will interact with collaborators at JPL, University of South Carolina, SUNY-Albany, and other institutions. Will work in a team environment for UV detector development and will contribute to team's expansion into new directions. Will publish results in technical refereed journals and present results in technical conferences.

**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:** Technology Development

**Advisors:**

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**Applications with citizens from Designated Countries will not be**



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**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

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