

Opportunity Title: Isotopic Characterization of Presolar Grains to Discern their Origins and Histories

Opportunity Reference Code: 0016-NPP-NOV23-JSC-PlanetSci

Organization: National Aeronautics and Space Administration (NASA)

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

Description: Presolar grains are bona fide pieces of stardust that condensed in the outflows of evolved stars, supernovae, and novae, and retain the highly anomalous isotopic compositions of their parent stars. As such, the isotopic characterization of presolar grains in the laboratory provides remarkable insight into stellar and galactic chemical evolution, and nucleosynthetic and mixing processes. Moreover, their mineralogies allow us to understand dust condensation processes in stellar atmospheres. Presolar silicate grains are particularly susceptible to alteration and their mineralogies and abundances in meteorites and interplanetary dust particles allow us to assess the degree of secondary hydrothermal alteration on the parent body and in interstellar space. As these grains constitute a building block of the Solar System, understanding their origins and histories is intimately linked with understanding the origin of the Solar System.

Research will focus on the multi-element isotopic analysis of presolar grains found in primitive meteorites and interplanetary dust particles using the NanoSIMS 50L instrument in the Astromaterials Research and Exploration Science (ARES) division at JSC. Data will be interpreted in the context of astrophysical models. We specialize in coordinating NanoSIMS analyses with focused ion beam (FIB)-assisted transmission electron microscope (TEM) mineral analyses of presolar grains, and these studies are highly encouraged. Other advance instrumentation available within ARES include scanning electron microscopes, electron microprobe, Raman microprobe, X-ray computed tomography (CT) scanner, and an array of spectrometers.

Location:

Johnson Space Center
Houston, Texas

Field of Science: Planetary Science

Advisors:

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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



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application with 1) a valid EAD card and 2) I-485 or I-589 forms in
pending status

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