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Dusty Plasma Physics Facility for the International Space Station

JOHN GOREE, The University of Iowa, Dept. of Physics and Astronomy, Iowa City, IA USA, INSEOB HAHN, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA USA — The Dusty Plasma Physics Facility (DPPF) is an instrument planned for the International Space Station (ISS). If approved by NASA, JPL will build and operate the facility, and NASA will issue calls for proposals allowing investigators outside JPL to carry out research, public education, and outreach. Microgravity conditions on the ISS will be useful for eliminating two unwanted effects of gravity: sedimentation of dust particles to the bottom of a plasma chamber, and masking weak forces such as the ion drag force that act on dust particles. The DPPF facility is expected to support multiple scientific users. It will have a modular design, with a scientific locker, or insert, that can be exchanged without removing the entire facility. The first insert will use a parallel-plate radio-frequency discharge, polymer microspheres, and high-speed video cameras. This first insert will be designed for fundamental physics experiments. Possible future inserts could be designed for other purposes, such as engineering applications, and experimental simulations of astrophysical or geophysical conditions. The design of the facility will allow remote operation from ground-based laboratories, using telescience.

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