

## **Study of dust particle parameter within inner solar system and its role in design consideration for processing electronics**

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Due to the ever-increasing interest in manned space missions to near-earth planets, especially Mars, it becomes imperative to understand the dynamics, composition, and origin of interplanetary dust particles in the satellite's path and beyond. It is well established that the Kuiper belt, Asteroid belt, and cosmic dust contribute majorly to the total dust present in the interplanetary space of the solar system. Dust particles produced from comets are generally on orbits with high inclination and eccentricity, while those stemming from asteroids are on lower inclination, with more circular orbits. An impact ionization dust detector can be used for the in-situ study of the interplanetary dust particles. The detector can provide particle parameters like mass and velocity. To understand the variation in the particle mass and velocity, we have analyzed the data collected by different dust detectors in past missions like Galileo dust detection system and Ulysses dust experiment. Further, a comparison of dust particle parameters in the inner solar system is carried out.

A dust detector is under development at PRL. The processing electronics play an essential role in the retrieval of dust parameters, and we have considered a few design options for it. The processing could be carried out using a Microcontroller/FPGA based software logic. The method and results could be useful to finalize the processing of the dust detector for further Planetary Missions.

### **References:**

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