PRCUNAR-2 Satellite Description and Purpose of Experiment

Exhibit for Ground Station License Application 0155-EX-CN-2020

The overall goal of the PRCUNAR-2 Cubesat mission is to increase understanding of the outcomes of relevant collisions among millimeter-sized particles, or “pebbles”, in a protoplanetary disk. In other words, how small particles floating in space, gather together, or aggregate, to form larger bodies.

The experiment will begin operating 30 minutes after deployment of the 3U cubesat from the ISS, and cease no more than 12 months later.

The experiment equipment consists of: (1) the experiment test cell subsystem, and (2) a video camera system to record high-frame-rate video of the collisional evolution of the test particles.

The experiment will take advantage of the long duration and high quality of microgravity provided by the cubesat in low earth orbit, to obtain a large sample of collisional outcomes (between millimeter sized pebbles) at very low relative velocities of less than 10 cm/second. This may provide insight into how such particles aggregate together to begin to form larger objects in space.

The experiment uses chambers containing different populations of particles. These chambers are mechanically shaken to induce collisions between the particles. Videos of the collisions will inform how collision parameters (mass, density, particle composition and collision velocity) lead to sticking, rebound and fragmentation of aggregates of particles.

The cubesat carrying the experiment, has applied for a license under file 1007-EX-CN-2019.