

Light scattering by powdered meteorites as asteroidal analogs and interplanetary dust components

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Laboratory light scattering measurements with the PROGRA2 experiment, in A300-CNES and ESA dedicated microgravity flights or in ground based configurations, offer an alternative to models for exploring the scattering properties of particles with structures too complex to be easily handled by computer simulations (<http://www.icare.univ-lille1.fr/progra2>) [1,2]. The technique allows the use of large size distributions (nanometers to hundreds of micrometers) and a large variety of materials, similar to those suspected to compose dust in comets, interplanetary dust, and asteroids.

Some meteorites are fragments of asteroids ejected during collisions or fragmentation. Some of them are related to their parent body (or to an asteroidal type). Powdered meteorites deposited on a surface can be used as regolith analogs of their parent body. Such work is in progress with the PROGRA² experiment. We use powdered meteorites to compare their polarization at 2 wavelengths to those of observations of different asteroids e.g. 21 Lutetia and 2867 Steins, two asteroids observed by Rosetta [3], or Orgueil to compare to C-type asteroids.

In the interplanetary dust complex, asteroids are probably the source of compact particles, while comets have been shown to eject compact and fluffy materials. To choose the best samples and size distributions, we consider previous numerical models for the interplanetary particles and their evolution with solar distance [4,5,6]. Results on analogs of cometary particles [7] and powdered meteorites as asteroidal particles will be presented and compared to numerical simulations as well as observations.

Keywords: polarization, dust, laboratory experiment, microgravity, regoliths, asteroid, interplanetary dust, cometary dust, Lutetia, Steins, meteorites

References

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