

Clues to the Size and Composition of Cosmic Dust Media from Light Scattering Observations

A. CHANTAL LEVASSEUR-REGOURD¹, JEREMIE LASUE¹

¹*Univ. Paris VI / Aeronomie CNRS-IPSL*

Comparing well-constrained observations and realistic numerical simulations of the light scattering properties of cosmic dust particles provides clues to their size distribution, their complex optical indices, and thus to their composition. Of special interest is the linear polarization, which does not depend upon the distances to the Sun and to the observer. The phase and wavelength dependences of the polarization are well constrained by the observations of some bright comets, e.g. 1P/Halley, C/1996 O1 Hale-Bopp, and of some near-Earth asteroids, e.g. 4179 Toutatis, 25143 Itokawa [1, 2, 3]. Various numerical approaches have been elaborated to simulate the light scattering properties of cosmic dust particles, which are most likely irregular and quite likely built up of aggregates of smaller grains. We use here models of light scattering by tiny core-mantle grains (typical of interstellar dust), by fractal aggregates of such grains, and by bigger compact particles [4]. Such models, perfectly appropriate for cometary or interplanetary dust cloud, may tentatively be adapted for fluffy regoliths. Besides, some validations through experimental simulations are already available. We will present results about the size (upper and lower cut-off, size distribution), the silicates to organics ratio, and their possible variations (related to temporal alteration) within various cosmic dust media. References [1] Dollfus, A. et al. 1988, *Astron. Astrophys.* 206, 348-356. [2] Lvasseur-Regourd, A. C. and Hadamcik, E. 2003, *J. Quant. Spectros. Radiat. Transfer*, 79, 903-910. [3] Cellino, A. et al. 2005, *Icarus*, 179, 297-303. [4] Lasue, J. and Lvasseur-Regourd, A. C. 2006, *J. Quant. Spectros. Radiat. Transfer*, in press.