

# Light Scattering Experiments at visible wavelengths

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Small solid particles are present in the atmospheres of planets, satellites, and comets in the form of aerosols, or cover their surfaces as regoliths. Dust particles absorb and scatter solar radiation and that coming from the surface affecting the atmospheric thermal structure. The strong dependence of the light scattered by those particles on their shape/structure, size and composition makes the measurements of the scattering pattern a powerful tool for particle characterization in remote sensing observations.

Over the last 10 years, the COsmic DUst LABoratory (CODULAB) [1] at the IAA-CSIC has produced an important number of high quality scattering matrices for clouds of randomly oriented cosmic dust analogues. The CODULAB measurements are performed at three different wavelengths (448, 520, and 647 nm) covering the scattering angle range from 3° to 177°. The data are available in digital form in the Amsterdam–Granada light scattering database [www.iaa.es/scattering](http://www.iaa.es/scattering) [2]. In the database we combine the measurements from CODULAB and those previously obtained with the Amsterdam Light Scattering setup [3]. The samples presented in the database comprise a wide range of sizes (sub-micron up to mm-sized grains), shapes, and compositions. In this talk we will discuss our current efforts to disentangle the influence of size, shape, and composition on the scattering pattern measured in the lab to link remotely observed photo-polarimetric quantities at various wavelengths with dust properties. We will also present a set of test measurements intended for evaluating the performance of the experimental apparatus at the three wavelengths studied.

## References

- [1] Muñoz, O., F. Moreno, D. Guirado, *et al.*, 2011: The IAA Cosmic Dust Laboratory: experimental scattering matrices of clay particles. *Icarus*, **211**, 894–900.
- [2] Muñoz, O., F. Moreno, D. Guirado, *et al.*, 2012: The Amsterdam–Granada Light Scattering Database. *J. Quant. Spectrosc. Radiat. Transfer* **113**, 565–574.
- [3] Hovenier, J. W., H. Volten, O. Muñoz, *et al.*, 2003: Laboratory studies of scattering matrices for randomly oriented particles. Potentials, problems, and perspectives. *J. Quant. Spectrosc. Radiat. Transfer* **79–80**, 741–755.

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