

Simulating light scattering by planetary-regolith analog sample

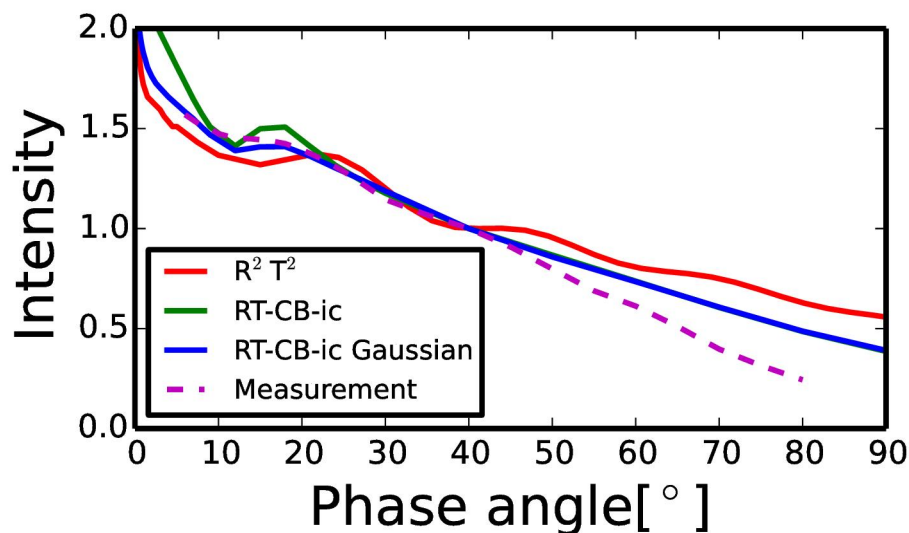
T. Väisänen¹, J. Markkanen¹, E. Hadamcik², A.C. Levasseur-Regourd³, J. Lasue⁴, J. Blum⁵, A. Penttilä¹, and K. Muinonen^{1,6}

¹Department of Physics, University of Helsinki, Finland; ²Latmos/CNRS, Pierre and Marie Curie Univ., France; ³LATMOS/CNRS, UPMC (Sorbonne Univ.), France; ⁴IRAP-CNRS, Univ. of Toulouse, France; ⁵IGEP, Brunswick Univ of Technology, Germany; ⁶Finnish Geospatial Research Institute, FGI, Finland;

Multiple scattering by a planetary-regolith analog surface consisting of closely equi-sized silica spheres was studied with Radiative Transfer with Reciprocal Transactions (R2T2)[1] and the Radiative Transfer Coherent Backscattering with incoherent input (RTCB-ic). The codes incorporate incoherent treatment which enhances the applicability of the radiative transfer [1]. The measured data is from the study made by Hadamcik et al. [2].

The sample is a low-density agglomerate produced by random ballistic deposition of almost equi-sized silica spheres (refractive index $n=1.5$ and diameter $1.52\pm 0.06 \mu\text{m}$). The volume fraction of the sample was 0.15 ± 0.03 and the wavelength used in the study was 632.8 nm. The diameter of the sample was 20 mm and the width 5 mm.

The best match was obtained with the RTCB-ic (see Fig. below) by varying the radius of the spheres with a Gaussian size-distribution.



REFERENCES

- [1] Muinonen K. et al. (2016), extended abstract for EMTS.
- [2] Hadamcik E. et al. (2007), JQSRT 106, 74–89.