

Hypervelocity experiments to estimate the light flash emitted by Smart 1 impact on the Moon

F. Ferri (1), G. Giacomuzzo (1), D. Koschny (2), D. Pavarin (1), A. Francesconi (1), A. Bettella (1), L. Tassinato (1), D. E. Flamini (3), F. Angrilli (1)

(1) CISAS Univ. Padova, Italy, (2) RSSD ESA, ESTEC, The Netherlands, (3) ASI, Roma, Italy
(francesca.ferri@unipd.it / Fax: +390498276855 / Phone: +390498276798)

We report on an impact hypervelocity experiments aimed at the characterization of the impact flash generated by an impact on analogues of planetary surfaces. The tests have been run at the impact facility of the CISAS “G. Colombo” of the University of Padova, using the two-stage light gas gun (<http://cisas.unipd.it/lgg/lgg.html>).

This work is directly relevant to the Smart-1 impact on the Moon, which at present, is scheduled to occur on September 2nd, 2006. The impact geometry of the Smart-1 impact is such that a light flash could be observed from the ground if it is bright enough. Current estimates put the flash at around 16 – 18 mag in the infrared, which would be observable. However, there clearly is a lack of data to precisely make a prediction of the brightness of such a flash. Very little experimental work on impact flash measurements has been published (e.g. Eichhorn, 1976). As a sideline, few observations of meteoroids impacts on the Moon have been performed and interpreted (e.g. Ortiz *et al.* 2000, Bellot Rubio *et al.* 2000, Yanagisawa *et al.* 2006).

Our experiments are performed in order to optically record the light flash generated by the impact as function of kinetic energy changing the mass and velocity of the projectiles. Crater size and mass are determined and eject fragment collected in order to estimate also the energy used for the fracturing process and thus further constraining the partition of the energy. The results of these experiments are mainly aimed to better predict the brightness of the expected impact flash and will also support the interpretation of the observational data of the impact event, by comparing the measurements with the observations, thus better constraining the current understanding of impact processes.

References

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