Velocity measurements of impact ejecta from regolith targets in oblique impacts

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The purpose of this study is to investigate the velocity distribution of powdery ejecta for various impact angles. Targets were soda-lime glass powders.The ejecta were detected by thin Al foil targets of different thickness. Microscopic photographs of the Al foil were taken in order to measure the number density of holes penetrated by the ejecta. An empirical relation of threshold penetration was adopted to determine the limiting velocity of the penetrating particles.

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We found that the velocity distribution of powdery ejecta depends strongly on impact angle. The results with impact angles of 15 and 30 deg are greater about two orders of magnitude than that for the case of vertical impact. The total number of holes on the Al foil in the case of impact angle of 90 deg is less than ten. This suggests that there is a cutoff in the velocity distribution of ejecta in vertical impacts. On the other hand, there are a few hundreds of holes on the Al foil in oblique impacts. Based on the obtained velocity distribution, we discuss impact angle dependence of the velocity distribution of powdery ejecta