ABSTRACT ONLY

EJECTION EXPERIMENT IN SOFT GRANULAR MEDIA

V. Abraham[1], T. Gallot[1], G. Tancredi[1] and C. Sedofeito[1]

Asteroids have been shown to be composed of granular media, Tancredi et al. (2012) predicted the creation of dust clouds at low escaping velocities post-impact. Their study proposed that a layer of particles shocked from below could cause particles to ascend from the surface, a phenomenon known as the "cocoa effect".

Our research focuses on exploring particle velocities ejected from soft granular media, specifically rubber particles sieved into various sizes. The primary objective is to understand the behaviour of the cocoa effect at a laboratory scale, emphasizing the measurement of both height and velocity reached. Rubber serves as our chosen medium due to its notably slower wave velocity compared to harder media, facilitating movement capture through high-speed cameras. The experimental setup entails an acrylic prism filled with rubber, positioned atop a shaker with an attached accelerometer. We varied the shaker's pulse amplitude. Particle movement is recorded with a high-speed camera and analysed using Particle Image Velocimetry (PIV) and correlation techniques (phase tracking and time correlation).

Initial findings provide insights into the beginning of lofting and velocity variations within the column of material. Notably, the analysis reveals a correlation between the amplitude and slope of the observed phenomena. A larger amplitude corresponds to a steeper slope. To validate our observations, correlation tracking was employed, further substantiating that larger slopes indeed align with more substantial amplitudes. These results contribute to a comprehensive understanding of the dynamics involved in lofting within the soft granular medium, laying the groundwork for further investigation and refinement of our experimental approach.

[1] Instituto de Física, Facultad de Ciencias, Universidad de la República, Uruguay (valeriabraham@gmail.com).