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Drop splashing on a thin particle layer EHSAN ESMAILI, SEUNGHO KIM, SUNGHWAN JUNG, Cornell University — In nature, high-speed raindrops impact and spread on particulate surfaces e.g. soil, pollens or spores on plant leaves. Although a drop impact on a surface is a traditional topic for industrial applications, drop-impact dynamics on a thin layer of particles in natural situations are less known about. Here we describe a single drop splashing on a thin layer of glass particles with different density of 1.1-4.35 (gcm^{-3}), the size of 10-98 micrometer, and the surface wettability of 35^o-105^o. Both experiments and scaling law argument have been carried out to determine the phase diagram for drop splashing. This study suggested that splashing occurs as particles cover the rim and cause the lamella to slide and levitate from the surface. It was shown that the Weber number and the particle density are two major factors to determine the critical packing fraction for splashing. The splashing on a particulate bed can lead to a better understanding of soil loss and erosion dynamics due to the raindrops.

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