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Raindrop impact on sand: dynamic and crater formation SONG-CHUAN ZHAO, RIANNE DE JONG, DEVARAJ VAN DER MEER, Univ of Twente — Droplet impact on a granular bed is very common in nature, industry, and agriculture and extends from raindrops falling on earth to wet granulation in the production process of many pharmaceuticals. In contrast to more traditionally studied impact phenomena, such as a droplet impact on solid substrate and solid object impact on fluid-like substrate, raindrop impact on sand induces more complicated interactions. First, both the intruder and the target deform during impact; second, the liquid composing the droplet may penetrate into the substrate during the impact and may, in the end, completely merge with the grains. These complex interactions between the droplet intruder and the granular target create the very diverse crater morphologies that has been described in the literature. An appealing and natural question is how the craters are formed. To gain insight in the mechanism of crater formation, we resolve the dynamics with high-speed laser profilometry and study the dependence of the dynamics on impact speed and packing fraction of the granular substrate. Finally, we establish a dynamical model to explain the various crater morphologies.

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