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**On the displacement dynamics and shape oscillation of an impacting water droplet on silicone oil pool at low weber number** DURBAR ROY, SOPHIA M, SAPTARSHI BASU, Department of Mechanical Engineering, Indian Institute of Science — Water droplet impact on liquid silicone oil pool was studied experimentally and theoretically using high speed imaging techniques. Interfacial studies related to immiscible liquids has a huge application in industries as well as medical fields. This study primarily focuses on the interfacial dynamics between the impacting water droplet and the silicone liquid bed with primarily focus on displacement dynamics and shape oscillations of the water droplet. The impact weber number was varied from 2 to approximately 20 in a controlled manner. The displacement of the water droplet was tracked using shadowgraphy and perspective view imaging at approximately 5000-10000 frames per second which was further corroborated using theoretical analysis. The forces affecting the displacement of the droplet are the drag forces, buoyancy forces and the weight of the droplet. However modelling the drag and buoyancy is quite challenging due to the deformation and shape oscillations of the droplet. At lower weber number several interesting phenomena were observed. The droplet oscillations leads to a transient air cavity formation just on the top of the droplet while it is sinking in the silicone oil. The air cavity collapses and pinches off forming an air bubble which gets entrapped in the oil medium.

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