

Abstract Submitted
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Drop-on-drop Impacts of Complex Liquids: the case of blood¹

FUJUN WANG, VANESSA GALLARDO, STEPHEN MICHIENSEN, TIEGANG FANG, North Carolina State University — The interaction of an impacting drop with a sessile drop has received rising attention due to its importance in many applications. Most of the prior work focused on water. In this study, the drop-on-drop impact of blood on a glass surface with varying impact velocities was experimentally investigated. Through a fine adjustment, we obtained a complete regime map, including the bouncing, coalescing, jetting, crown formation, fingering, and film breakup. We quantified the maximum spread diameter (D_m) and the final contact diameter on the surface (D_f) after drop-on-drop impact. The measurement of D_m was compared with a model for water and modifications were added for the non-Newtonian effects. For the latter, we found a critical Weber number (We_c), below which D_f will remain the same as the sessile drop. Beyond We_c , an increase of D_f was found to be caused by the collapse of the crown. We finally identified the difference between the fingering and film breakup. The film breakup was generated by the off-center impact during the spreading phase while the fingering breakup took place for the center impact during the collapsing process. The presented cases can well mimic the consecutive impact of blood drops in forensic science.

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