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Experiments on the breakup of drop-impact crowns by Marangoni holes ABDULRAHMAN ALJEDAANI, C. L. WANG, A. JETLY, E. Q. LI, S. T. THORODDSEN, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia — High-speed video experiments investigate the crown break up due to Marangoni instability when a highly viscous drop impacts on a thin layer of lower-viscosity liquid, which also has lower surface tension than the drop liquid. The presence of this low-viscosity film modifies the boundary conditions, giving effective slip to the drop, which forms a regular bowl-shaped crown, which rises vertically away from the solid and subsequently breaks up through the formation of a multitude of holes. Previous experiments [1] have proposed that the breakup of the crown results from a spray of fine droplets ejected from the thin film. These droplets can hit the inner side of the crown forming spots with lower surface tension, which drive the hole formation. We test the validity of this assumption by doing close-up imaging to identify individual spray droplets, to show how they hit the crown and influence the hole formation. For all the impact experiments, the release height was kept constant at H=5.4 m, leading to an impact velocity of U=9.5 m/s on the thin liquid film. [1] Thoroddsen, S. T., Etoh, T. G. & Takehara, K., Crown-breakup by Marangoni instability. *J. Fluid Mech.*, **557**, pp. 63-72 (2006).

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