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Interface solidification of impinging metal drops JOLET DE RUITER, DAN SOTO, KRIPA VARANASI, Massachusetts Institute of Technology — Molten metal droplet deposition is important in manufacturing techniques such as spray deposition and metal inkjet printing. Key parameters are the final splat morphology and its adhesion to the base substrate. How to control these parameters is still poorly understood, since droplet deformation, cooling and solidification happen simultaneously. Here, we studied the contact patch formed between the metal drop and the base substrate, varying the thermal properties and the initial temperature of the substrate, and the initial temperature of the drop. We identify various scenarios for interface solidification, including smooth liquid-spread contact patches, entrapment of air pockets, and transient re-melting of the interface. The transitions between various scenarios can be rationalized from the interfacial temperature estimated by heat conduction, and taking into account the flow of liquid metal.

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