Abstract Submitted
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Dynamics of a cylinder plunging into liquid: a numerical study[1]

HANG DING, University of Science & Technology of China — The impact of a cylinder on a liquid surface and subsequent events are investigated numerically. The flows are resolved by solving the Navier-Stokes equations and the Cahn-Hilliard equation. Moving contact lines are modeled by a diffuse interface model (Seppecher 1996; Jaqcmin 2000), and contact-angle hysteresis is included (Ding&Spelt 2008). The method is validated by comparison to the experiments by Aristoff and Bush (2009). Our studies focus on the dynamics of the waves induced by the impact and the cavity collapse behind the cylinder. A variety of parameters affect the flow behaviors such as wettability, impact speed, viscosity etc. Their effects on the transition of the flow phenomena are investigated through parametric simulations over relevant ranges of Weber and Reynolds numbers and contact angles.

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