

Abstract Submitted
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How do rigid plates attach to a fluid-fluid interface?¹ LIAM O'BRIEN, DEEPAK KUMAR, NARAYANAN MENON, Univ of Mass - Amherst — We study experimentally the dynamics of a rigid plate settling towards a fluid-fluid interface. We sediment rigid plates at low Re in silicone oil, toward an interface with a water subphase. For plates that are wet by the subphase, sedimentation is followed by a two-step attachment to the interface. The plate first slides along the interface until it becomes nearly parallel to it. Thereafter, instead of squeezing out the remaining fluid, a wetting foot from the subphase spreads over the plate. We report the time-dependence of both these stages of attachment, as well as the scaling with the dimensions of the plate. We also show experiments in which the plate is not wetted by the subphase, and a lubrication layer has to be expelled before attachment can occur.

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