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Apex Jets from Impacting Drops JEREMY MARSTON, A-STAR Institute of Chemical & Engineering Sciences, Singapore, SIGURDUR THORODDSEN, Mechanical Engineering, National University of Singapore — A new jetting phenomenon has been observed experimentally when a viscous drop, such as glycerin, impacts onto a low-viscosity, low-surface tension liquid pool, such as methanol. This jet is produced by the ejecta sheet which emerges from the free surface of the pool, moves up along and wraps around the surface of the drop. The convergence and closure of this sheet at the top apex of the drop produces a thin vertical jet along the axis of symmetry at velocities of more than 10 times that of the drop. These jets are only observed for a narrow range of impact conditions. The drop impact velocity must be high enough that the ejecta sheet has sufficient inertia to reach the apex, but not so high that it detaches. Thus we identify critical Reynolds and Weber numbers. Jetting has been observed both for drops which are miscible and immiscible with the pool liquid, under a different range of impact conditions but never for pools of water, as the surface tension is then significantly larger than that of the drop. Marangoni stresses may act in this case to promote separation and prevent the jetting.

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