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The Dynamics of Drop Impact JOHN KOLINSKI, Harvard School of Engineering and Applied Sciences, SHMUEL M. RUBINSTEIN, Department of Physics and Harvard School of Engineering and Applied Sciences, SHREYAS MANDRE, Brown University, L. MAHADEVAN, Harvard School of Engineering and Applied Sciences — There are many aspects of the dynamics of liquids wetting solid surfaces that are not fully understood. One such aspect is what happens at the first instance of contact. We study the dynamics of a partially wetting fluid drop as it approaches a solid surface with velocities ranging from microns- to meters-per-second. We use TIR (total internal reflection) microscopy to probe what happens immediately above the surface as the drop approaches and study two different regimes previously inaccessible experimentally: 1. A high impact velocity regime where the initial dynamics are governed by inertia and the formation and breakup of a thin air film trapped under the approaching liquid at microsecond timescales and 2. A slow approach regime where the dynamics, also occurring at microsecond timescales, are governed mainly by the solid liquid interactions and contact line dynamics.

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