

Abstract Submitted  
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**Experiments on elastohydrodynamics of a free particle on a soft substrate** BAUDOUIN SAINTYVES, THEO JULES, Harvard University, THOMAS SALEZ, ESPCI-Gulliver, L. MAHADEVAN, Harvard University — We present the results of experiments on the dynamics of a negatively buoyant cylinder in a viscous bath that sediments, rolls and slides close to a soft inclined wall. We show that an elastohydrodynamic lift force - not present in the hard-wall case - balances gravity, thus allowing for a fast steady-state sliding regime. Our results can be explained in terms of a recently published scaling approach. We also show that the cylinder displays other non-intuitive behaviors such as counter-clock wise rotation and an oscillatory behaviours, qualitatively consistent with some recent theoretical predictions. The work is a step in explaining aspects of phenomena that include the dynamics of cartilaginous joints, and motion of a cell in a microfluidic channel or in a blood vessel, and perhaps even some geophysical phenomena, all of which intimately couple elasticity and hydrodynamics.

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