Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Mobility of Yield-Stress Fluids on Lubricant-Impregnated Surface LEONID RAPOPORT, BRIAN SOLOMON, KRIPA VARANASI, Massachusetts Inst of Tech-MIT, VARANASI RESEARCH GROUP TEAM — Assuring the flow of yield-stress fluids is an essential problem for various industries such as consumer products, health care, and energy. Elimination of wall-induced pinning forces can potentially save power and cleaning costs as well as enable the flow of yield-stress fluids in channels previously considered too narrow. Lubricant-Impregnated Surfaces (LIS) have been demonstrated to change the dynamic behavior of yield-stress fluids and enable them to move as bulk without shearing at all. However, despite the wide applicability of this technology and its general appeal, the fundamental principles governing the performance of yield stress fluids on LIS have not yet been fully explained. In this work, we explore the mobility of yield stress fluids on a wide range of LIS, and explain the connection between macroscale behavior and the microscale properties of the LIS. Specifically, we show a striking difference in mobility between an LIS that contains a lubricant which fully spreads on the rough micro-features of the surface, and an LIS that contains a lubricant which only imbibes these features but does spread over them

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Date submitted: 27 Jul 2017 Electronic form version 1.4