Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

**Surface textures and Non-Newtonian fluids for decreased friction** JONATHON SCHUH, RANDY EWOLDT, University of Illinois at Urbana-Champaign — Using surface textures has been shown to decrease friction in lubricated sliding contact. A growing trend in the lubrication industry is to add polymers to base oils in order to improve the oil's effectiveness as a lubricant. These polymer additives cause the oil to become a viscoelastic lubricant that will behave differently than a simple Newtonian lubricant. We present an experimental investigation varying both the surface texture depth profile and the viscoelastic lubricant in order to determine their effects on friction reduction. Gap-controlled experiments were performed on a custom tribo-rheometer in order to systematically examine the friction reduction by varying the Reynolds number, Weissenberg number, and Deborah number in bi-directional motion. Cavitation effects are not present so that the normal force is produced solely by the surface textures and the lubricants. We show that the symmetry of the surface textures must be broken in order to produce normal forces above the viscoelastic response, and that an optimal angle of asymmetry $\beta$ exists for decreasing friction with asymmetric surface textures and viscoelastic lubricants.

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Date submitted: 24 Jul 2015 Electronic form version 1.4