

Abstract Submitted
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The fluid mechanics of channel fracturing flows: experiment¹

AHMADREZA RASHEDI, Ohio University University of Bordeaux, ZACHERY TUCKER, Ohio University, GUILLAUME OVARLEZ, University of Bordeaux, SARAH HORMOZI, Ohio University — We show our preliminary experimental results on the role of fluid mechanics in channel fracturing flows, particularly yield stress fracturing fluids. Recent trends in the oil industry have included the use of cyclic pumping of a proppant slurry interspersed with a yield stress fracturing fluid, which is found to increase wells productivity, if particles disperse in a certain fashion. Our experimental study aims to investigate the physical mechanisms responsible for dispersing the particles (proppant) within a yield stress carrier fluid, and to measure the dispersion of proppant slugs in various fracturing regimes. To this end we have designed and built a unique experimental setup that resembles a fracture configuration coupled with a particle image/tracking velocimetry setup operating at micro to macro dimensions. Moreover, we have designed optically engineered suspensions of complex fluids with tunable yield stress and consistency, well controlled density match-mismatch properties and refractive indices for both X-rays and visible lights. We present our experimental system and preliminary results.

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Ahmadreza Rashedi
Ohio University
University of Bordeaux

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