

Abstract Submitted  
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**Flow induced streamer formation in particle laden complex flows** NANDINI DEBNATH<sup>1</sup>, MAHTAB HASSANPOURFARD<sup>2</sup>, Univ of Alberta, RANAJAY GHOSH<sup>3</sup>, University of Central Florida, JAPAN TRIVEDI<sup>4</sup>, THOMAS THUNDAT<sup>5</sup>, ALOKE KUMAR<sup>6</sup>, Univ of Alberta — We study the combined flow of a polyacrylamide (PAM)solution with polystyrene (PS) nanoparticles, through a microfluidic device containing an array of micropillars. The flow is characterized by a very low Reynolds number ( $Re \ll 1$ ). We find that for exceeding a critical Weissenberg number ( $Wi \geq 20$ ), PS nanoparticles localize near pillar walls to form thin slender string-like structures, which we call ‘streamers’ due to their morphology. Post-formation, these streamers show significant viscous behavior for short observational time-scales, and at longer observational time scales elastic response dominates. Our abiotic streamers could provide a framework for understanding similar structures that often form in biological systems.

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