Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Effect of Inertial Migration of Particles on Flow Transitions of a Suspension in Taylor–Couette Geometry LINA BAROUDI, ALEXANDER LIGAY, Manhattan College, MADHU MAJJI, University of California, Santa Barbara , JEFFREY MORRIS, CUNY City College of New York — This study presents an experimental investigation into the influence of inertial migration of neutrally buoyant non-Brownian particles on inertial flow transitions of a suspension in Taylor–Couette geometry. A concentric cylinder Taylor-Couette device with a stationary outer cylinder and rotating inner cylinder is considered. The device has an inner to outer radius ratio of 0.1. Starting with the circular Couette flow (CCF) regime with inertially migrated concentration profile in this regime, a lower onset Reynolds number observed when starting with uniform suspension concentration. For inertially migrated concentration profile in CCF, the non-axisymmetric flow states between CCF and Taylor vortex flow (TVF) reported by Majji et al. (JFM 835, 936 (2018)) were also observed here but at lower compared to uniform suspension concentrations. On contrary to the stabilizing effect obtained from the linear stability analysis of CCF with varying viscosity profile in the annular region, our results reveal a destabilizing effect to the CCF due to the inertially migrated concentration profiles.

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Date submitted: 02 Oct 2019 Electronic form version 1.4