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Applying Tomographic PIV to Turbulent Taylor-Couette Flows¹ DANIEL BORRERO-ECHEVERRY, School of Physics and Center for Nonlinear Science, Georgia Institute of Technology, DONALD WEBSTER, School of Civil and Environmental Engineering, Georgia Institute of Technology, MICHAEL SCHATZ, School of Physics and Center for Nonlinear Science, Georgia Institute of Technology — Over the years many techniques have been used to measure velocity fields in Taylor-Couette flows. However, these have been limited to measurements at discrete points (i.e., LDV or hotwire measurements) or planar sections of the flow (i.e., planar or stereo PIV). Tomographic PIV is a strong candidate for extending these measurements to three component volumetric velocity fields. Applying tomographic PIV to Taylor-Couette flows poses some serious challenges (curved interfaces, mechanical vibration, and moving surfaces). We discuss how these issues may be resolved and present temporally and spatially resolved measurements of the structures that form when finite-amplitude perturbations are applied to linearly stable Taylor-Couette flow and trigger the transition to turbulence.

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