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Twente Turbulent Taylor-Couette DENNIS VAN GILS, CHAO SUN, DETLEF LOHSE, University of Twente, Physics of Fluids, The Netherlands, PHYSICS OF FLUIDS TEAM — A newly constructed turbulent Taylor-Couette (TC) system consists of two independently rotating cylinders of 0.93 m in length and the inner and maximum outer radii are respectively 0.20 m and 0.28 m. The maximum rotation rates are 1200 RPM for the inner cylinder and 600 RPM for the outer cylinder. With the working fluid held at a constant temperature within at least 0.1 degree Celsius the setup allows for precisely controlled measurements. The maximum Reynolds number that can be achieved with inner cylinder rotation only, is estimated to be around $2x10^6$. This allows for measurements well into the turbulent regime. The system is designed not only for single-phase flow studies, but also for two-phase flow research like bubbly drag reduction. The clear acrylic outer cylinder and several view ports in the top and bottom plate allow for optical measurement techniques such as LDA, PIV and PTV. Instead of only measuring global quantities like drag, temperature and pressure, the system is also equipped with a multitude of sensors for measuring local quantities. Combining the detailed localized information from inside of the gap with the global quantities, provides a way to study the mechanisms of bubbly drag reduction.

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