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Boundary layers and global stability of laboratory quasi-Keplerian flow E.M. EDLUND, H. JI, Princeton Plasma Physics Laboratory — Studies in the HTX device at PPPL, a modified Taylor-Couette experiment, have demonstrated a robust stability of astrophysically relevant, quasi-Keplerian flows. Independent rings on the axial boundary can be used to fine tune the rotation profile, allowing ideal Couette rotation to be achieved over nearly the entire radial gap. Fluctuation levels in these flows are observed to be at nearly the noise floor of the laser Doppler velocimetry (LDV) diagnostic, in agreement with prior studies under similar conditions. Deviations from optimal operating parameters illustrate the importance of centrifugally unstable boundary layers in Taylor-Couette devices of the classical configuration where the axial boundaries rotate with the outer cylinder. The global stability of nearly ideal-Couette flows, with implications for astrophysical systems, will be discussed in light of the global stability of these flows with respect to externally applied perturbations of large magnitude.

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