

Abstract Submitted
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Analysis of Separation Efficiency of an Advanced Annular Couette Centrifuge¹ B. GARCIA, E. P. GILSON, PPPL, H. JI, PPPL/Princeton Univ. — Experiments on modified Taylor-Couette devices have shown that the fluids rotating in them have sufficiently low turbulence to allow for efficient centrifugal separation. The Advanced Annular Couette Centrifuge (AACC) has differentially rotating lids, a pump connected to several configurable inlets and outlets, and an inner and outer cylinder spinning in the same direction. The inner cylinder spins faster by no more than the squared ratio of the cylinder radius ratio to achieve high shear without inviting hydrodynamic instabilities. The differentially rotating lids are critical for controlling the turbulence at high Reynolds number. AACC holds 15 gallons of water and uses sub-micron titanium dioxide powder as the separation test particles. Various methods of measuring the powder concentration will be discussed, including laser refractometry and absorption spectroscopy, and results from the experiment will be compared with those of traditional centrifuges to look for improved separation, which could have important applications to a broad range of existing applications and open-up new application areas.

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