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Two-dimensional turbulence experiments in sheared flow using circular Couette cell: initial results.[1] MARTIN KEARNEY-FISCHER, PAUL FONTANA, SIMON WINDELL, SEAN ROGERS, Seattle University — An experiment to study turbulence in quasi-two-dimensional flows with a controlled mean flow shear has been built. Experiments are underway to investigate the suppression of turbulent transport by sheared flow as seen in geostrophic flows and laboratory fusion plasmas. The apparatus, a circular Couette cell, uses a liquid film of dilute soap solution suspended freely in an annular channel with a rotating outer boundary. The channel is 7 cm wide with an average radius of 46.5 cm, and can be rotated at angular speeds exceeding 10 rad/s. Turbulence is driven independently via electromagnetic forcing. The rate of turbulence injection can be varied continuously, and its spatial scale corresponds to the spatial frequency of an array of NdFeB magnets. Diagnostics include particle imaging velocimetry, two-point laser Doppler velocimetry, and thickness measurements via reflection interferometry. Initial analysis will be presented which indicates the existence of both turbulent suppression and expansion in high and low frequency regimes respectively. Plans for further analysis will also be presented.

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