Objective

Establish and undertake an experimental investigation of velocity and temperature fluctuations in the annular flow between a heated rotating cylinder and a stationary cooled outer cylinder, aimed at understanding the interaction between coherent regions of velocity and temperature to improve models for the resulting heat transfer and enable the manipulation and control of these flows.

Project Details

Project will involve the use of a laser optical measurements, torque transducers and heating elements to establish and measure the temperature, frictional losses and the structure of the fluid velocity field. The adjacent figure illustrates the basic flow geometry as well as the Taylor vortex structures that develop beyond a critical Reynolds number. These experimental will enable the investigation of the role of surface roughness and temperature gradients on the turbulent flow statistics as a function of rotational velocity throughout the Couette, Taylor Vortex and featureless turbulence regimes that exist in rotational machinery such as bearings, gas turbines and other rotational machinery.

Prerequisites

Student should have High Distinctions in Fluid Mechanics and Thermodynamics units.

Additional Information

If shortlisted applicants will be required to attend an interview.