Design of a triple plasma device for double layer and turbulence investigations

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A triple plasma device is being constructed at the University of Wisconsin- Madison for basic plasma physics investigations. The device consists of two outer chambers and a central chamber. Separate plasmas are generated in the two outer chambers, and their interactions are measured in the central chamber. DC plasma is generated via thermionic emission of electrons from a hot-filament and rf plasma is generated either capacitively or inductively. The device is used to investigate double layer structures [Coakley and Hershkowitz, Physics of Fluids 22, 1171 (1979)] and beam plasma instabilities. The design, construction, and operation of this device are discussed. Initial results are presented here.

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