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Confocal Laser Induced Fluorescence of Argon Plasmas[1] EARL SCIME, MARK SODERHOLM, West Virginia University — Laser Induced Fluorescence (LIF) provides measurements of flow speed, temperature and when absolutely calibrated, density of ions or neutrals in a plasma. Traditionally, laser induced fluorescence requires two ports on a plasma device. One port is used for laser injection and the other is used for fluorescence emission collection. Traditional LIF is tedious and time consuming to align. These difficulties motivate the development of an optical configuration that requires a single port and remains fully aligned at all times; confocal LIF. Our confocal optical design employs a single two inch diameter lens to both inject the laser light and collect the stimulated emission from an argon plasma. A pair of axicon lenses create an annular beam path for the emission collection and the pump laser light is confined inside the annulus of the collection beam. The measurement location is scanned radially by manually adjusting the final focusing lens position. Here we present optical modeling of and initial results from the axicon based confocal optical system. The confocal measurements are compared to traditional, two-port, LIF measurements over the same radial range.

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