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PLIF Studies of Flowing Plasmas BRETT JACOBS, WALTER GEKELMAN, STEPHEN VINCENA — A narrow sheet of pulsed plasma current ($\delta < R_{ci}, \delta \sim c/\omega_{pe}$) is investigated in a strongly magnetized plasma column ($n \sim 3x10^{12} cm^{-3}, D > 500 R_{ci}, B_0 \sim 1kG, T_{rep} = 1sec$) with a PLIF (Planar Laser Induced Fluorescence) diagnostic. The current is carried by electrons and is pulsed on after the background highly ionized, quiescent plasma is established. The formation of the current channel results in a deep density depression ($\delta n/n \sim .5$) and triggers a complex flow pattern in the plasma. A 100ns (stretched) pulse from a tunable dye laser (FWHM = .0018nm) is shaped into a thin slab by cylindrical optics and resonantly excites an electronic transition in a plane of argon ions. The fluorescence from the ions is recorded by a fast I-CCD camera as the laser's wavelength is tuned across the resonance line. In these experiments the ion flow pattern and distribution function is measured at thousands of spatial positions by sythesizing the I-CCD images of the LIF light. The short pulse length of the laser allows for measurement of the evolution of the flow, which occurs on the timescale of hundreds of microseconds. *Research supported by the Department of Energy and conducted at UCLA's Basic Plasma Science Facility on the LAPD.

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