Abstract Submitted
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Ion velocity measurements on NSTX using the SWIFT diagnostic (Shifted Wavelength/lnterference Filter Technique)[1] STEPHEN PAUL, ROBERT KAITA, A. LANE ROQUEMORE, Princeton Plasma Physics Laboratory, NOBUHIRO NISHINO, Hiroshima University — Using a split-image interference filter technique, the measurement of ion flows is being extended from individual analog channels (as implemented on Columbia's HBT-EP tokamak) to a 2-D view on NSTX. A beam-splitter duplicates the image, each of which is then filtered with separate interference filters whose passbands have opposite linear slopes. A high frame-rate Photron Ltd. U1tima SE CMOS digital camera views He II line emission at 468.6 nm at the edge of the center stack. A white-plate calibration of two 64 x 64 pixel regions of the detector in necessary to measure relative gain and linearity of the corresponding pixes. A spectral high-resolution wavelength calibration is done for each pixel-pair, probably requiring the use of a tunable, narrow-band, bright light source such as a dye-laser. But once completed, the ion velocity can be calculated very simply from the ratio of the intensities from the two images. From data taken when viewing through a He II interference filter, the light level in helium discharges in NSTX is adequate to make observations at 1,150 frames per second. A preliminary optical system was bench-tested and the lens used can image a 20 x 20 cm region of the plasma with 0.3 mm spatial resolution.

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