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**Real-Time Plasma Rotation Diagnostic for Measuring Small Doppler Shifts on the HBT-EP Tokamak** B. DEBONO, J.M. HANSON, R. JAMES, D.A. MAURER, M.E. MAUEL, G.A. NAVRATIL, T.S. PEDERSEN, D. SHIRAKI, J. LEVESQUE, Columbia University, S.F. PAUL, PPPL — An optical, fast time-scale toroidal velocity measurement has been developed for use on the HBT-EP tokamak. A unique aspect of this diagnostic's measurement technique is that the Doppler shift is determined from the ratio of the light intensity from two detectors rather than by resolving the emission line with a traditional spectrometer. This is accomplished using an inexpensive, high-throughput measurement of impurity line emission with interference filters as the spectral device. One detector views the plasma through an interference filter whose passband has a negative slope, with a second detector viewing the plasma through a positive-slope filter. The signal ratio varies as the emission line is Doppler shifted across the filter passbands. The measurement technique is not sensitive to changes in plasma emission levels. For interference filters with a linear passband the shifted He-II wavelength can be reduced to a simple function of the signal ratio, the channel's relative responsivity, and the two filters transmission curves. A positively biased probe was inserted into HBTEP's edge plasma and used to induce a toroidally directed E x $B_p$ torque on the plasma. Edge plasma toroidal velocity measurements will be reported using a 10% He impurity seed in standard D discharges.

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