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Diagnostic for Measuring the Ion Density Ratio in a Plasma with Two Ion Species JEFFREY ROBERTSON, STEVE VINCENA, TROY CARTER, PATRICK PRIBYL, Univ of California - Los Angeles — Understanding of turbulence and transport in multi-ion species plasmas is important for establishing predictive capability for burning tokamak plasmas with comparable densities of D and T. In order to effectively analyze plasmas with multiple ion species, a new diagnostic is needed in order to measure the density profiles of the individual ion species. In plasmas with two ion species, an ion-ion hybrid resonance frequency exists, from which one can estimate the ratio of the two ion densities [1]. Previous work has been able to successfully measure this resonant frequency on a global scale via observing cutoff for shear Alfven waves [2]. However, in order to make spatially-resolved measurements a new diagnostic is needed. A new antenna diagnostic was developed to measure the ion-ion hybrid resonance frequency locally in the Large Plasma Device. Initial results using mixes of Helium and Neon will be presented. Additionally, theoretical work was done in order to expand the regime of plasma parameters in which this diagnostic may be applied. [1] Buchsbaum, S. J. (1960), Resonance in a plasma with two ion species, Phys. Fluids, 3, 418, doi:10.1063/1.1706052 [2] Vincena, S. T., W. A. Farmer, J. E. Maggs, and G. J. Morales (2011), Laboratory realization of an ion-ion hybrid Alfvén wave resonator, Geophys. Res. Lett., 38, L11101, doi:10.1029/2011GL047399.

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