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Mode conversion in three ion species ICRF heating scenario¹ Y. LIN, E. EDLUND, P. ENNEVER, M. PORKOLAB, J. WRIGHT, S. WUKITCH, MIT Plasma Science and Fusion Center — Three-ion species ICRF heating has been studied on Alcator C-Mod and on JET [1]. It has been shown to heat the plasma and generate energetic particles. In a typical three-ion scenario, the plasma consists of $^{60-70\%}$ D, $^{30-40\%}$ H and a trace level (1% or less) of 3 He. This species mixture creates two hybrid resonances $(D^{-3}He \text{ and } {}^{3}He^{-H})$ in the plasma, in the vicinity of the 3 He IC resonance (on both sides). The fast wave can undergo mode conversion (MC) to ion Bernstein waves and ion cyclotron waves at the two hybrid resonances. A phase contrast imaging (PCI) system has been used to measure the RF waves in the three-ion heating experiment. The experimentally measured MC locations and the separating distance between the two MC regions help to determine the concentration of the three species. The PCI signal amplitudes for the RF waves are found to be sensitive to RF and plasma parameters, including P_{RF}, T_e, n_e and also the species mix concentration. The parameter dependences found in the experiment will be compared with ICRF code simulations. [1] Ye.O. Kazakov, invited talk, this conference.

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