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The ion-ion hybrid Alfvén resonator in ITER[1] G.J. MORALES, W.A. FARMER, UCLA — In magnetized plasmas with two ion species, the cold, ion-ion hybrid frequency alters the propagation of Alfvén waves. For compressional modes propagating across the magnetic field, the ion-ion hybrid frequency acts as a resonance, which can be used for plasma heating. In contrast, the shear Alfvén wave experiences a cutoff at locations where the wave frequency equals the ion-ion hybrid frequency. Since fusion plasmas must operate with two dominant ion species, Deuterium and Tritium, it is of interest to explore the role of this cutoff in such an environment. In a tokamak, the periodic variation in the strength of the magnetic field along a field-line results in two conjugate ion-ion hybrid points that could, in principle, give rise to a shear Alfvén wave resonator. The present study examines various issues (curved field-lines, focusing and divergence of ray trajectories) that play a role in the formation of such a resonator in ITER plasmas, in which the high electron temperature requires that the electron response be treated adiabatically.

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G.J. Morales
UCLA

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