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Doppler Resonance Effect on Rotational Drive by Ion Cyclotron Minority Heating[1] V.S. CHAN, Y.A. OMELCHENKO, General Atomics, S.C. CHIU, Sunrise R&M, Inc. — In previous studies, the Orbit-RF code was used to investigate details of the rotational profile when minority ions are continuously being heated and slowed down in steady-state. In order to make contact with results by other authors, vanishing parallel wavenumber was assumed. It was demonstrated that co-and counter-rotation with low- and high-field resonance respectively was a consequence of finite orbit width. Experimental results reported on Alcator C-Mod and JET, however, indicated the rotational direction remained unchanged when the resonance was moved from the low- to the high-field side. This study reports Orbit-RF simulations with finite parallel wavenumber, $n_{||}$. It is found that with $n_{||}$ in the co-current direction, the rf produces a net co-direction torque leading to co-rotation for both low- and high-field resonance. With negative $n_{||}$, the rotation reverses to the counter-current direction. The directions are consistent with the prediction of rf-induced quasilinear transport. With a symmetric spectrum, the net torque is much smaller and slightly negative similar to the case for $n_{||} = 0$. To explain the experiments, possible mechanisms that can break the symmetry in wave heating will be explored.

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