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Nonlinear heating of ions by electron cyclotron frequency waves in tokamaks[1] K. HIZANIDIS, Y. KOMINIS, NTUA, Athens, Greece, A.K. RAM, PSFC, MIT — Previously it has been shown that small amplitude waves in the lower hybrid frequency range can nonlinearly heat ions in plasmas [1]. We study the possibility of heating ions by two electron cyclotron (EC) waves with slightly different frequencies in tokamak plasmas. The EC beams can be either the X or O waves and propagate at two different angles with respect to the local magnetic field. The ion motion in the interaction region, where the beams overlap spatially, is determined by canonical perturbation theory applied to the Hamiltonian of the ion motion. An analysis of the EC beam parameters for the two waves that are required to energize ions is presented. We consider the possibility of using such a scheme to heat ions in ITER-type plasmas.

[1] D. Bénisti, A. K. Ram, and A. Bers, Phys. Plasmas **5**, 3224 (1998); A. K. Ram, A. Bers, and D. Bénisti, J. Geophys. Res. **103**, 9431 (1998).

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