

Abstract Submitted
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Electron cyclotron waves and current drive in a relativistic plasma¹ J. DECKER, CEA, Cadarache, France, A.K. RAM, PSFC, MIT — The importance of relativistic effects on wave damping for electron cyclotron waves has been established for the electromagnetic X and O modes [1], and for the electrostatic Bernstein mode [2]. We have developed a numerical code R2D2 to solve the dispersion relation for EC waves in a fully relativistic plasma [2]. The wave polarization, energy flow density, and density of power absorbed are also calculated. We investigate, in detail, the effects of relativity on EC wave damping and propagation. R2D2 is coupled to a kinetic code DKE [3] which solves the fully relativistic Fokker-Planck equation. Two different current drive mechanisms using EC waves – the Fisch-Boozer and the Ohkawa schemes – are studied. The importance of relativistic effects on these current drive mechanisms is determined.

[1] I.P. Shkarofsky, Phys. Fluids **9**, 561 (1966).

[2] A.K. Ram, J. Decker, and Y. Peysson, J. Plasma Phys. **71**, 675 (2005).

[3] J. Decker and Y. Peysson, Euratom-CEA Rep. EUR-CEA-FC-1736 (2004).

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