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Relativistic effects in electron cyclotron resonance heating and current drive[1] A.K. RAM, PSFC, MIT, J. DECKER, CEA, Cadarache, France — In the electron cyclotron range of frequencies (ECRF) the X and O modes are used in conventional tokamaks for generating plasma current and for modifying the current profile. The same is envisioned for ITER. In spherical tokamaks (ST) electron Bernstein waves (EBW) are expected to play a similar role. For a proper description of the damping of EC waves, the code R2D2 numerically solves the fully relativistic dispersion relation [1]. It also evaluates the quasilinear diffusion operator for the interaction of EC waves with electrons. This is used in the relativistic three-dimensional Fokker-Planck code LUKE [2] to solve for the electron distribution function. We will present results obtained with R2D2 and LUKE on the relativistic characteristics of EC waves and on the driven plasma current. We will show that the EBW interaction with electrons in present day STs has similar physics to that of O waves interacting with electrons in ITER.

[1] A. K. Ram, J. Decker, and Y. Peysson, *J. Plasma Physics* **71**, 675 (2005).
[2] J. Decker and Y. Peysson, *Euratom-CEA Report EUR-CEA-FC-1736* (2004).

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