

Abstract Submitted
for the APR06 Meeting of
The American Physical Society

Electron Cyclotron Current Drive by Bernstein Waves¹ A.K. RAM, PSFC, MIT, J. DECKER, Y. PEYSSON, CEA-Cadarache, France — The high- β plasmas in spherical tori (ST), like in NSTX, are overdense to the traditional X and O modes in the electron cyclotron range of frequencies (ECRF). However, in the same frequency range electron Bernstein waves (EBW) can propagate in ST plasmas and damp effectively on electrons at the Doppler-shifted electron cyclotron resonance or its harmonics. Since externally generated current is necessary for steady state operation and for controlling the current profile, we examine the role of EBWs in STs. We find that EBWs can generate plasma current by the Ohkawa scheme in the outer half of the plasma and the Fisch-Boozer scheme in the core of the plasma. The current drive efficiency is much higher with EBWs than with the traditional ECRF waves as the EBWs interact with more energetic electrons. We will discuss the properties of EBWs and their interaction with electrons for current drive. Results from two codes, one which solves the fully relativistic plasma dielectric tensor and the other which solves the drift kinetic equation for electrons, will also be presented.

¹Supported by DoE Grants DE-FG02-91ER-54109 and DE-FG02-99ER-54521.

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Date submitted: 13 Jan 2006

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