

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Numerical Study of HHFW Heating in FRC Plasmas

FRANCESCO CECCHERINI, LAURA GALEOTTI, TRIALPHA ENERGY INC., USA, MARCO BRAMBILLA, MAX PLANCK INSTITUTE FUER PLASMA-PHYSIK, GERMANY, SEAN DETTRICK, XIAOKANG YANG, TRIALPHA ENERGY INC., USA, TAE TEAM — The TriAlpha Energy (TAE) code RF-Pisa is a Finite Larmor Radius (FLR) full wave code developed over the years to study RF heating in the Field Reversed Configuration (FRC) in both the ion and electron cyclotron regimes. The FLR approximation is perfectly adequate to address RF propagation and absorption at the fundamental and second harmonic frequencies (as in the minority heating scheme), but it is not able to describe higher order processes such as high-harmonic fast waves (HHFW). The latter ones have frequencies lying between the ion cyclotron and lower hybrid resonances and they may represent a viable path to develop an efficient method to deposit energy inside the FRC separatrix, as suggested by recent results obtained at NSTX. A significant upgrade of RF-Pisa to include HHFW has been undertaken. In particular, the so-called quasi local approximation [1] originally proposed for toroidal geometries has been re-derived for the cylindrical geometry and a new HHFW version of RF-Pisa concurrent to the FLR version has been developed. Here we present the first results of the application of the new code to FRC equilibria and we discuss the features of the dispersion relations and the absorption processes which characterize this novel regime. [1] Brambilla, PPCF, 44, 2423 (2002)

Francesco Ceccherini
TRIALPHA ENERGY INC., USA

Date submitted: 13 Jul 2017

Electronic form version 1.4