

Abstract Submitted  
for the DPP14 Meeting of  
The American Physical Society

**Experimental Measurements of the Lower Hybrid Electric Field and Induced Neutral Flow in Tore Supra by Optical Emission Spectroscopy**<sup>1</sup> E.H. MARTIN, C.C. KLEPPER, R.C. ISLER, ORNL, M. GONICHE, IRFM, J.B.O. CAUGHMAN, ORNL — Recently, the RF electric field vector ( $\mathbf{E}_{\text{LH}}$ ) in front of a lower hybrid (LH) launcher, operating at 3.7 GHz, at the low field side of the Tore Supra tokamak was determined by spectroscopic analysis of passive  $D_\beta$  spectral emission from the near-antenna plasma. The  $\mathbf{E}_{\text{LH}}$  was determined by globally minimizing the  $\chi$  associated with the experimental and theoretical spectral line profile. The theoretical profile is calculated from a non-perturbative solution to the Schrödinger equation, which includes the magnetic and dynamic electric field vectors. The magnitude, the direction, and the scaling with LH power of the measured  $\mathbf{E}_{\text{LH}}$  were fairly consistent with those calculated from a full-wave LH model. In addition to  $\mathbf{E}_{\text{LH}}$  the inboard and an outboard neutral flow was determined from the Doppler shifts associated with the  $D_\alpha$  and  $D_\beta$  spectral profiles. It was found that excitation of the LH wave induced both an inboard and outboard co-current neutral flow, which is linearly dependent on injected power; preliminary results indicate ICRH decreases the LH wave-induced co-current neutral flow. Neutral flow velocities are consistent with measurements of ion flow velocities obtained by charge exchange recombination spectroscopy.

<sup>1</sup>Work supported by the US DOE under Contract No. DE-AC05-00OR22725 with UT-Battelle, LLC., and by the European Communities under the contract of Assoc. EURATOM-CEA and within the framework of the EFDA.

E.H. Martin  
ORNL

Date submitted: 11 Jul 2014

Electronic form version 1.4