Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Nonlinear global gyrokinetic PIC simulations of collisionless TEM turbulence S. JOLLIET, B.F. MCMILLAN, T.M. TRAN, X. LAPILLONNE, L. VILLARD, Ecole Polytechnique Federale de Lausanne, Centre de Recherches en Physique des Plasmas, Association Euratom- Suisse, CH-1015 Lausanne, Switzerland, A. BOTTINO, Max Planck Institut fur Plasmaphysik, IPP-EURATOM Association, Garching, Germany, P. ANGELINO, DRFC Association EURATOM-CEA, CEA Cadarache, 19108 St Paul-lez-Durance, France, Y. IDOMURA, Japan Atomic Energy Agency, Higashi-Ueno 6-9-3, Taitou, Tokyo 110-0015, Japan — Micro-instabilities, such as Ion Temperature Gradient modes (ITG) and Collisionless Trapped Electrons Modes (CTEM), are commonly held responsible for anomalous transport observed in tokamaks. While there have been a wide range of nonlinear studies on ITG turbulence, very little is known about the nonlinear physics of CTEM. This work presents the first linear and nonlinear simulations of ITG-CTEM turbulence performed with the global PIC code ORB5 [1]. A linear benchmark of ORB5 against other gyrokinetic codes will be shown. Numerical aspects such as numerical noise will be discussed. The simulations will focus on nonlinear phenomena including detrapping, toroidal coupling, zonal flows, profiles evolution and heat transport.

[1] S. Jolliet *et al.*, to appear in Comput. Phys. Commun.

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Date submitted: 31 Aug 2007 Electronic form version 1.4