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Simulations of collisional Trapped-Electron-Mode turbulence with the global gyrokinetic δf Particle-in-Cell code ORB5 THIBAUT VERNAY, STEPHAN BRUNNER, LAURENT VILLARD, Ecole Polytechnique Federale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas, CH-1015 Lausanne, Switzerland, BEN MCMILLAN, Centre for Fusion, Space and Astrophysics, Department of Physics, University of Warwick, Coventry CV4 7AL, United Kingdom, ALBERTO BOTTINO, Max-Planck-Institut fur Plasmaphysik, Boltzmannstrasse 2, EURATOM Association, D-85748 Garching, Germany — Global collisional gyrokinetic simulations of Trapped-Electron-Mode (TEM) instabilities, for which the drive is the electron temperature gradient, are presented. The numerical tool is the Particle-In-Cell code ORB5, upgraded with linearized electron collision operators. Electrons are treated according to the so-called hybrid model, considering kinetic trapped electrons and adiabatic passing electrons. The linear TEM growth rates are found to be damped by electron collisions. The effect of the ratio T_e/T_i on the collisional damping is studied. The accuracy of the Lorentz model is tested against the full linearized operator predictions. The issue of ρ^* effects in TEM simulations is addressed. A critical electron temperature gradient for linear TEM instabilities is established and compared to the temperature gradient dependence of the turbulence level in non-linear global simulations. Finally, the effects of the zonal flow shearing rate on TEM turbulence are investigated in both collisionless and collisional global ORB5 simulations.

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