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Fluid electron and gyrokinetic ion simulation for tearing mode DONGJIAN LIU, JIAN BAO, ZHIHONG LIN, University of California, Irvine, GTC TEAM, GTC TEAM, GTC TEAM — A finite mass electron fluid model have been developed to study the low frequency electromagnetic modes in magnetized plasmas[1]. Coupled to the gyrokinetic ions, the global gyrokinetic particle simulation of tearing modes have been developed and verified in the gyrokinetic toroidal code (GTC). GTC linear simulations in the fluid limit of the kink-tearing, resistive tearing modes and collisonless tearing mode in the cylindrical geometry agree well with the magnetohydrodynamic eigenvalue and initial value codes. Ion kinetic effects are found to reduce the radial width of the tearing modes. GTC simulations of the resistive tearing modes in the toroidal geometry find that the toroidicity reduces the growth rates[2]. Reference: [1] Dongjian Liu and Liu Chen, 2011, Plasma Physics and Controlled Fusion, 53 062002 [2] Dongjian Liu, Wenlu Zhang, Joseph McClenaghan, Jiaqi Wang and Zhihong Lin, 2014, Physics of Plasmas 21,122520.

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