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Core Gyrofluid Simulations of Ion Temperature Gradient Turbulence Using BOUT++ S.S. KIM, WCI Center for Fusion Theory, NFRI, Korea, X.Q. XU, LLNL, Livermore, HOGUN JHANG, TONGNYEOL RHEE, S. TOKUNAGA, WCI Center for Fusion Theory, NFRI, Korea, P.W. XI, LLNL, Livermore, P.H. DIAMOND[1], WCI Center for Fusion Theory, NFRI, Korea — Starting from a tokamak edge plasma simulation code, BOUT++ has evolved into a versatile framework that can be used to simulate a wide range of fluid models in complicated magnetic geometry. Extension of the code into the core region is a natural outgrowth, aiming at the possible integration of self-consistent core-edge coupling. In this regard, we developed a core gyro-Landau-fluid code using a 3-field model. Landau damping is implemented using the Hammett-Perkins closure that has been realized in configuration space to cope with the BOUT++ framework. Verification of the code was realized by comparing linear growth rates calculated from BOUT++ with those from an eigenvalue solver and gyrokinetic codes. On-going works focus on the physics studies of the internal transport barrier (ITB) formation in a reversed shear plasma. In particular, we emphasize the role of non-resonant modes on the ITB formation. Details of the code development and preliminary physics results will be presented.

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