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Tokamak turbulence simulations using BOUT++ framework in core region S.S. KIM, WCI Center for Fusion Theory, NFRI, Korea, X.Q. XU, LLNL, H. JHANG, TONGNYEOL RHEE, WCI Center for Fusion Theory, NFRI, Korea, P.W. XI, LLNL, P.H. DIAMOND, WCI Center for Fusion Theory, NFRI, Korea, A. DIMITS, M. UMANSKY, LLNL, G.Y. PARK, WCI Center for Fusion Theory, NFRI, Korea — Development of a self-consistent, core-edge integrated simulation capability is a long standing problem in fusion simulation program. Such capability would yield insight into questions related to global profile dynamics originating from L to H and internal transport barrier (ITB) transitions. 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. For the realization of the self-consistent core-edge coupled simulation, we developed a core gyro-Landau-fluid code using BOUT++ framework. The primary physics goal of this development is to realize ITB formation in the presence of non-resonant modes and to study effects of flat q-profile and rotation shear on core profile de-stiffening. Initial efforts focused on the self-consistent simulation of core ITG turbulence and code verification. Verification of the code was realized by comparing linear growth rates calculated from BOUT++ with those from gyrokinetic codes. Global nonlinear simulations using 3+1 fields model were performed for ITG turbulence. Details of the code development and preliminary physics results will be presented.

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