

Gyrofluid Simulation of Tokamak Plasmas

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Abstract

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→H and internal transport barrier (ITB) transitions, edge localized modes (ELM), and intrinsic rotation, to name just a few important problems in tokamak plasmas. Gyrofluid simulations are well-suited for this purpose owing to its fast computational time (capability of a long time simulation, e.g. adiabatic power ramp simulation), while keeping the relevant physics. In this talk, gyrofluid models and codes for tokamak turbulence simulation will be introduced. Recent gyrofluid studies of intrinsic rotation, hysteresis in ITB, role of external torque in ITB formation/profile de-stiffening will be presented and discussed.