Gyrofluid simulations of electromagnetic turbulence in the plasma edge

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Turbulent transport in the plasma edge of magnetically confined fusion plasmas highly influences the overall core performance and is directly related to the fusion gain. In particular in high confinement regimes electromagnetic effects, also called finite β effects, become important. In the present contribution the impact of electromagentic effects on turbulent heat and particle transport in the plasma edge is studied by means of the three-dimensional gyrofluid electromagnetic code GEMR [1, 2]. The finite β stabilization of ion temperature gradient (ITG) turbulence will be studied. Also the transition from ITG to micro-tearing mode (MTM) turbulence will be investigated. Particular attention is paid to the role of quasi-coherent modes often observed in high confinment regimes [3, 4, 5, 6]. Furthermore, the role of electromagnetic effects on intermittency is studied. As recently developments in diagnostics, as for example the line ratio spectroscopy on helium [7] or correlation electron cyclotron emission [8] allows to investigate the cross-phase between density and electron temperature fluctuations, also this cross-phase will be studied as a possible identifier for underlying instabilities.

References

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