Local vorticity analysis in full-f gyrofluid model with FELTOR code

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Recent studies have presented the key role of the ExB flow and its shear in the transition from L to H mode in fusion devices [1,2]. Therefore, understanding the sources of the radial electric field in the edge of the plasma is crucial to produce a theoretical model that can reproduce the L-H transition.

Some of the experimental observation of the radial electric field present the diamagnetic flows, with the radial force balance, as the most important mechanism to explain the edge radial electric field and the profiles in the region [3,4]. Other experimental observations point to the change of the Grad B drift direction and other magnetic configuration changes as other main effect on the L-H transition [5,6]. There is, therefore, a need for more deep analysis of the sources of the radial electric field on the edge.

In the present contribution we will present the initial investigations of the vorticity dynamics in the edge of toroidal plasmas with the full-F gyrofluid code FELTOR [7]. We will look at the most relevant terms from this equation and the poloidal distribution of the quantities, and their possible relevance in explaining the unsolved dependences of the L-H transition with the magnetic field configuration.

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