

Drift-Wave Turbulence in a Tokamak Edge Plasma

Authors : S. Belgherras Bekkouche, T. Benouaz, S. M. A. Bekkouche

Abstract : Tokamak plasma is far from having a stable background. The study of turbulent transport is an important part of the current research and advanced scenarios were devised to minimize it. To do this, we used a three-wave interaction model which allows to investigate the occurrence drift-wave turbulence driven by pressure gradients in the edge plasma of a tokamak. In order to simulate the energy redistribution among different modes, the growth/decay rates for the three waves was added. After a numerical simulation, we can determine certain aspects of the temporal dynamics exhibited by the model. Indeed for a wide range of the wave decay rate, an intermittent transition from periodic behavior to chaos is observed. Then, a control strategy of chaos was introduced with the aim of reducing or eliminating the weak turbulence.

Keywords : wave interaction, plasma drift waves, wave turbulence, tokamak, edge plasma, chaos

Conference Title : ICEET 2014 : International Conference on Civil, Environmental Engineering and Technology

Conference Location : Istanbul, Türkiye

Conference Dates : December 05-06, 2014