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DEVELOPMENT AND VERIFICATION OF COMPUTATIONAL MODEL FOR CONTROL OF PLASMA AND HALO CURRENT IN EAST TOKAMAK

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A new technology for developing fusion energy is to use hydrogen isotopes i.e., deuterium (D) and tritium (T). It is a combine effort for building up of International Thermonuclear Reactor (ITER) named as Tokamak, which will come into operation in 2020. Handsome amount of work has already been done by many researchers contingent with plasma shape, halo current and plasma equilibrium properties by numerical techniques. Halo current calculation and plasma stability is the most important problem in fusion technology. It seems to be an open boundary problem in which a system is designed in order to compel the plasma in it designated orbit. There encounter large degrees of freedom in shaping hot plasma in torus form as long as symmetry in magnetic field is maintained in specific magnetic flux surfaces. Therefore, non-linear plasma coupled system model have been developed which allows an effective way to study the chaotic behavior of the main plasma characteristics under controlled conditions. Keeping this criteria, theoretical approach has been developed in order to evaluate the new innovative model for calculating different aspects and stability of Tokamak reactor. Stability achieved in Tokomak includes creating balance between pressure and forces due to magnetic field and to setup the shape and position of plasma. The developed system compels the plasma in same orbit and associated two isolated equilibrium points of Tokamak for gaining the stability and instability position via theoretical approach. It can be much convenient to calculate the chaotic behavior of Tokamak. These models also provide the total magnetic field, asymmetric forces, conducting points and poloidal halo current. Finally, experimental data will be comparing by taking the difference between the two theoretical models. For the critical analysis of all aspects of this research, a non-linear system has been developed and is given as,

Eligible for student paper award?

Yes

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