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Simulations of Energetic Particle Mode in NSTX*

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The energetic particle-driven MHD modes in the National Spherical Tokamak Experiments are studied using the global particle/MHD hybrid code M3D[1]. Neutral Beam Fast Ion-driven modes in the TAE frequency range were observed in the NSTX plasmas. Both steady state and bursting modes were seen depending on experimental conditions. The goal of this study is to understand the nonlinear dynamics of the fast ion-driven MHD modes in a spherical tokamak plasma. Our simulation results show unstable TAEs with mode number $n = 1 \sim 4$ and mode frequencies consistent with the experimental observation. Initial nonlinear simulation results indicate that the mode frequency chirps down as the modes move out radially. Details of the simulations will be presented.

References

[1] W. Park, E.V. Belova, G.Y. Fu, X.Z. Tang, H.R. Strauss, L.E. Sugiyama, Phys. Plasmas **6** 1796 (1999)

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