

Parametric dependence of EPMS in NSTX

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The International Tokamak Experimental Reactor (ITER) will have a large population of non-thermal, energetic ions consisting of fusion generated alphas and beam ions injected for current profile control. Potential redistribution and/or loss of those non-thermal ions is thus of concern as it will modify heating profiles, current profiles, and could lead to unacceptable levels of heating of plasma facing components. Redistribution and losses of fast ions have been documented as resulting from multiple Alfvénic modes, Toroidal Alfvén Eigenmodes and energetic particle modes (fishbones) on many smaller plasma devices. In this paper we present data and analysis of modes driven by neutral beam ions on the National Spherical Torus Experiment (NSTX). Fishbone-like EPMS are found predominantly in plasmas with $q_{\min} \approx 1$. The long-lived modes, beginning with a frequency chirp (EPM-LLM), typically appear for a broad range of $q_{\min}$ with $1 < q_{\min} < 4$, and the frequency chirp is predominantly a result of a drop in the core toroidal rotation.