

Search for Energetic Particle- GAM in NSTX

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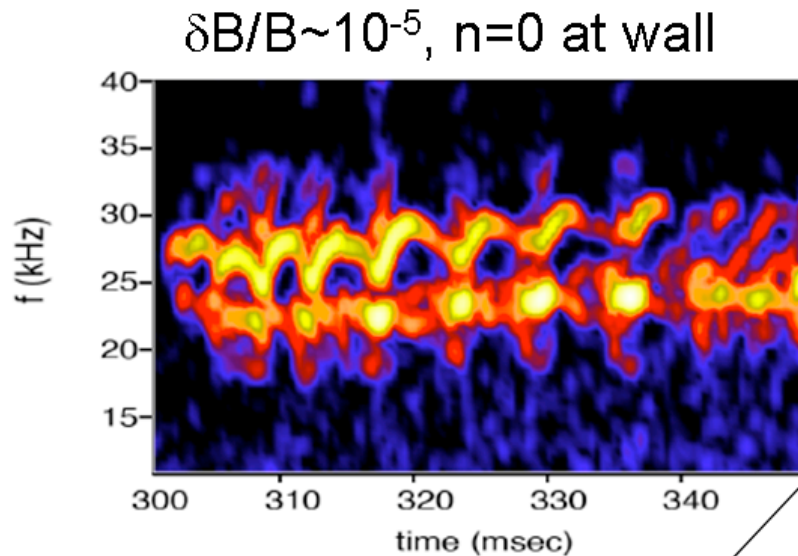
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$n=0$ GAM-like modes have been excited by counter-beam in DIII-D in reversed shear plasmas

The mode has a broad peak near the q_{\min} surface;

Excitation occurs for $q_{\min} > 2$;

The mode frequency is well inside the GAM continuum.



← Energetic particle –GAM
(EGAM)

Nazikian et al, PRL, 2008
Fu, PRL, 2008

Motivation for EGAM XP

- EGAM can induce substantial loss of energetic particles;
- Coupling of theory and experiment will be substantial here because nonlinear simulations of this mode have already been carried out.

The goal of this XP is to excite EGAM in NSTX using conditions similar to DIII-D's

- Will develop a NBI-heated L-mode reversed shear plasma to search for EGAM.
- A key condition for the instability is the wave-particle resonance condition which is $v_{\text{beam}} \sim q * v_{\text{thermal}}$ where q is the safety factor. Thus, we need large q , high plasma temperature.
- The reversed shear plasmas with high temperature ($> 1\text{keV}$) can be achieved by pre-heating using HHFW.
- Counter-injection is preferred for excitation of EGAM.
- NSTX target plasma: $q_{\text{min}} > 2$, $T_e \sim T_i \sim 1\text{keV}$, $B \sim 0.5\text{T}$, $n_e \sim 10^{13}\text{cm}^{-3}$, $E_{\text{beam}} < 70\text{keV}$.