NSTX

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Investigation of a High-Energy Feature (HEF) Observed on Beam-injected Energetic Ion Spectra using the E||B Neutral Particle Analyzer on NSTX

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NSTX Research Forum
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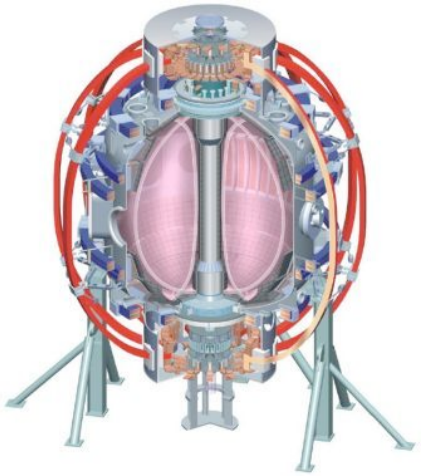
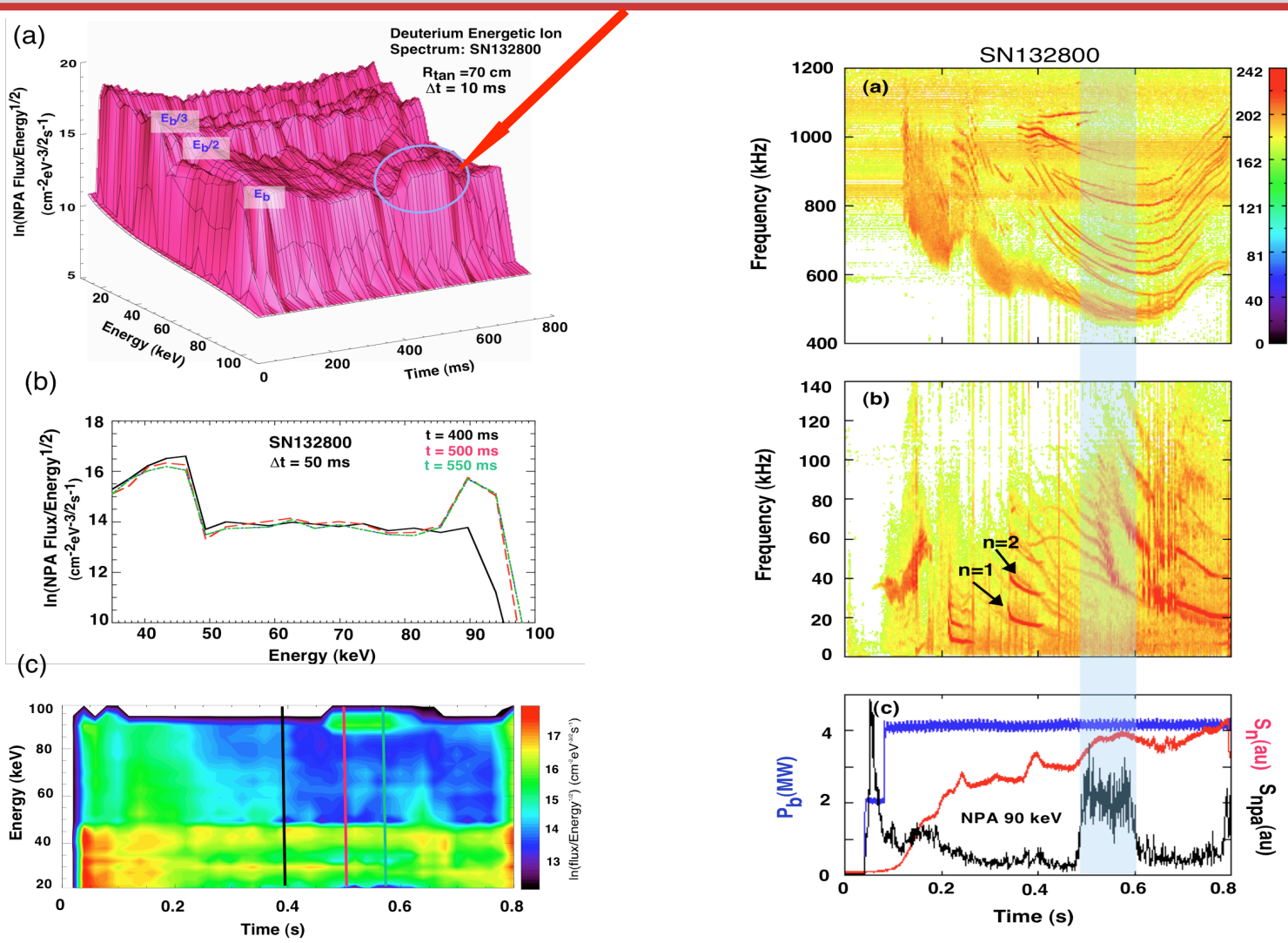


Illustration of a High-Energy Feature (HEF) at t ~ 0.5-0.6 s

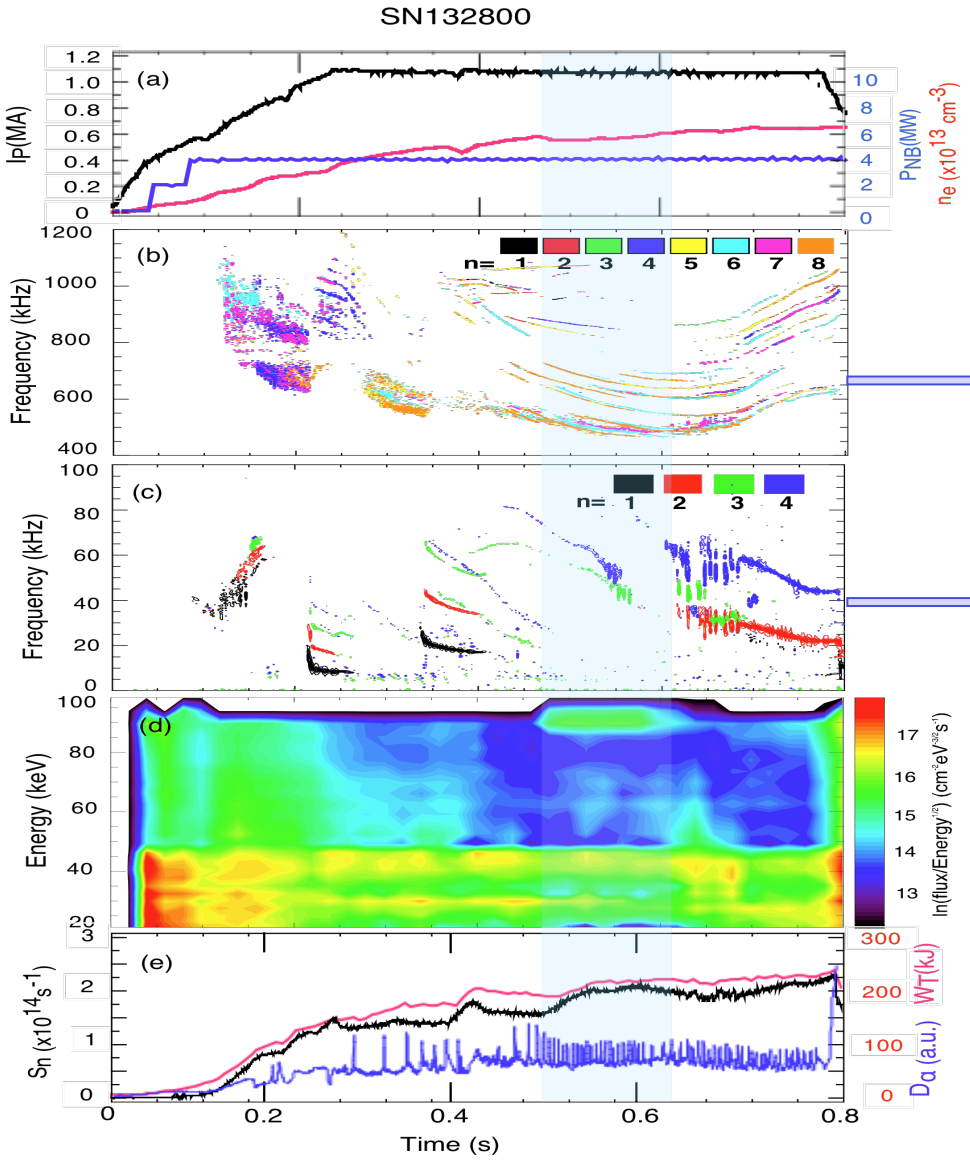
HEF: a strong increase (~ 4x) in the EllB NPA flux localized around the NB full energy

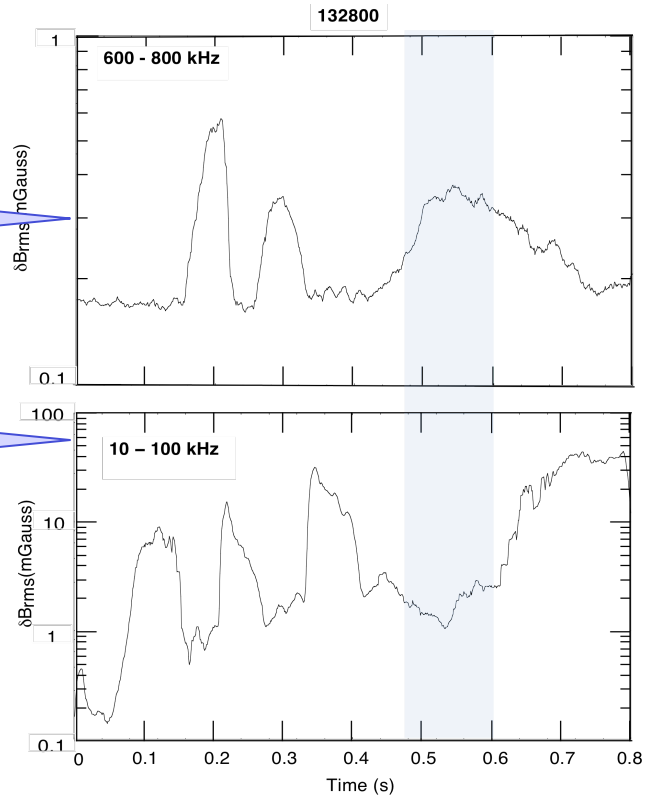


- H-mode with I_p = 1.1 MA, B_T = 4.5 kG, A&C @ 90 keV, P_{NB} = 4 MW, n_eL ~ 6x10^{13} cm^{-2}

Discharge Data and Mirnov δB_{rms} Evolution SN132800

HEFs occur during a period that is kink-free with reduced TAE and robust CAE/GAE





- HEFs have been observed only in H-mode discharges: never in L-modes.

- HEFs have been observed *in piggy-back mode* for I_p = 0.8-1.2 MA, B_T = 4.5-5.5 kG, NPA R_{tan} = 60-90 cm, $P_b \geq 4$ MW.

XP for Investigation of the High-Energy Feature (HEF)
Total ~ 12 Shots

- **Investigate HEF dependence on NB energy, E_b**
  - **E_b scan with ABC @ 90, 75, 60 keV** **(Fiducial + 2 shots)**
- **Investigate HEF occurrence with NB sources @ mixed E_b**
  - **A @ 90 keV, B@ 75 keV, C@60 keV** **(1 shot)**
- **Investigate HEF on/off transition behavior**
  - **A + BC notch, B + AC notch, C + AB notch, 60 ms notch** **(3 shots)**
- **Investigate HEF spatial and pitch dependencies**
  - **NPA horizontal scan at optimal E_b** **(6 shots)**
- **Special run requirements**
  - **minimal Lithium as needed for machine conditioning (e.g. < 30 mg/shot, no LLD)**
  - **MHD mode structure diagnostics (BES, Reflectometry, High-k Scattering, FIReTIP)**
  - **desire t-FIDA operational**