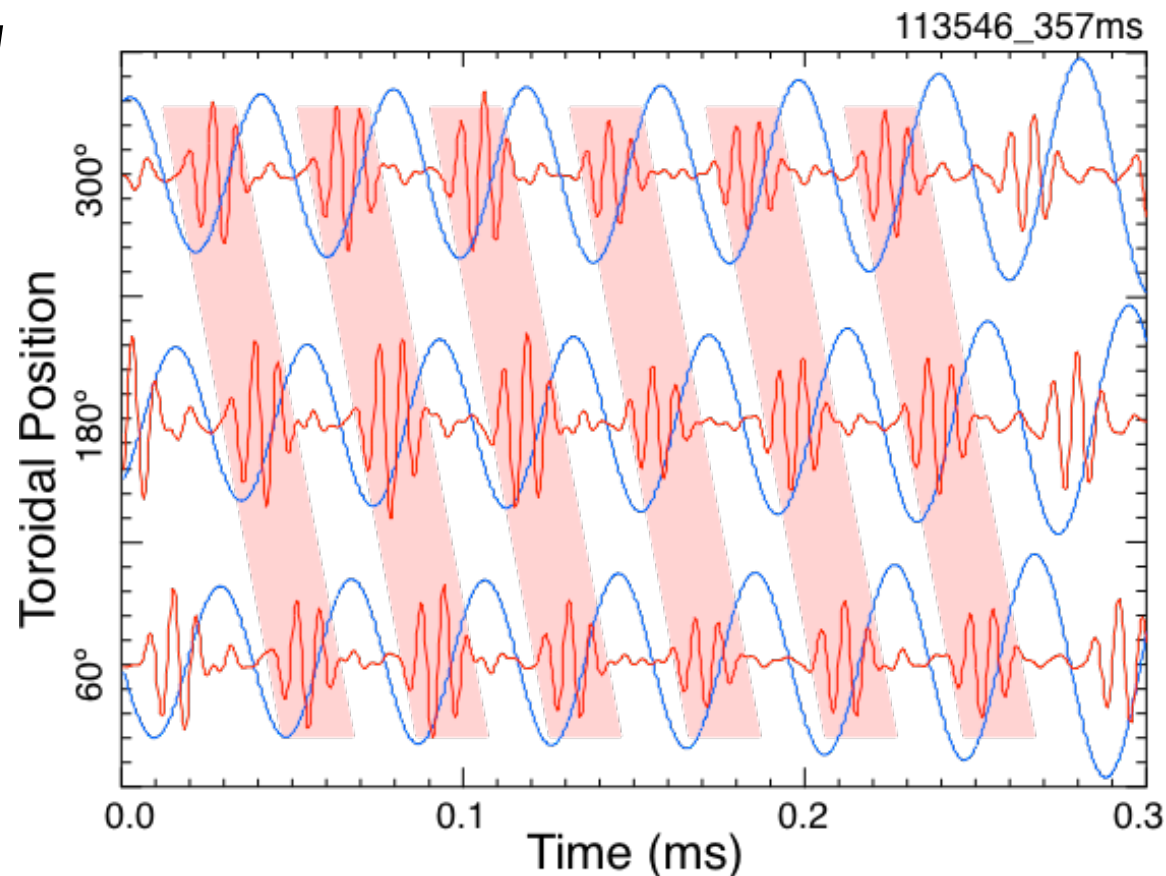


# Report on IAEA and Energetic Particles ITPA meetings

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# Three-wave coupling

- Three-wave coupling, that is mode localization in the presence of longer wavelength mode is seen in NSTX between TAE, EPM and CAE/GAE.
- Three papers at IAEA addressed this issue:
- Biancalani - *Shear Alfvén wave continuous spectrum in presence of a magnetic island.*
- Y Yakovenko - *Effect of the Toroidal Asymmetry on the Structure of TAE modes in Stellarators:*
  - BOA-fe code using ballooning formalism finds strong localization.
  - This case had modes with degenerate frequencies, however.
- D Spong - *Energetic Particle Physics Issues for 3-dimensional Toroidal Configurations:*
  - Has 3-D Shear Alfvén Wave code with coupling to sound-wave continuum incl.
  - Applied to LHD and DIII-D



# Fast ion transport on LHD

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- Y Todo - *Simulation Study of Interaction between Energetic Ions and Alfvén Eigenmodes in LHD*
  - Simulations are done with AE3D code eigenmodes, but without experimental measurements of mode structure or amplitude
- M Nishiura - *Fast-ion Transport during Repetitive Burst Phenomena of Toroidal Alfvén Eigenmodes in the Large Helical Device:*
  - sFLIP data supporting Todo's simulations. Losses seen synchronized with TAE bursts
- Toi - *Alfvén Eigenmodes and Geodesic Acoustic Modes Driven by Energetic Ions in an LHD Plasma with Non-monotonic Rotational Transform Profile:*
  - Used beam driven currents to create "reverse" shear plasmas in LHD (confirmed with MSE).
  - Saw modes identified as frequency-sweeping rsAE and GAMs

# Fast ion studies on MAST

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- S Pinches - *Fast particle Instabilities in MAST:*
  - Study of damping rates using coils to excite TAE, EAE and CAE; important for ITPA.
  - CAE/GAE excited by new PINI spectra similar to NSTX. Also see Angelfish.
  - Also see "cwFB" and correctly identified it as having internal kink structure
  - TRANSP modeling suggests fast ion diffusion of  $0.5 \text{ m}^2/\text{s}$
  - No talk of TAE avalanches yet?

# Energetic Particle studies on AUG

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- Garcia-Munoz - *MHD Induced Fast-Ion Losses on ASDEX Upgrade*
  - Using FLIP-type diagnostic to measure pitch and energy of lost fast ions.
  - Looking at NTM/BAE and TAE induced losses.
- H Zohm - *Overview of ASDEX Upgrade Results:*
  - Emphasizing again the Sierpis mode, but probably BAE. Considered important in fast ion transport.

## TAE studies on C-mod

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- J Snipes - *Characterization of Stable and Unstable Alfvén Eigenmodes in Alcator C-Mod:*
  - Study of damping rates using coils to excite modes; important for ITPA.

# ITPA

- Highest priority is measurement of linear damping rates of TAE (primarily through excitation of modes with coils).
  - Difficulty has been in identifying mode whose damping rate is being measured; no real discrimination on  $n$ 's being excited and limited ability to measure  $n$  of excited mode?
  - Results of comparison between measurements and calculations on JET are not good.
  - Possibly NSTX could contribute through RF beat-wave excitation...
  - MAST, C-Mod, JET will pick up the slack.