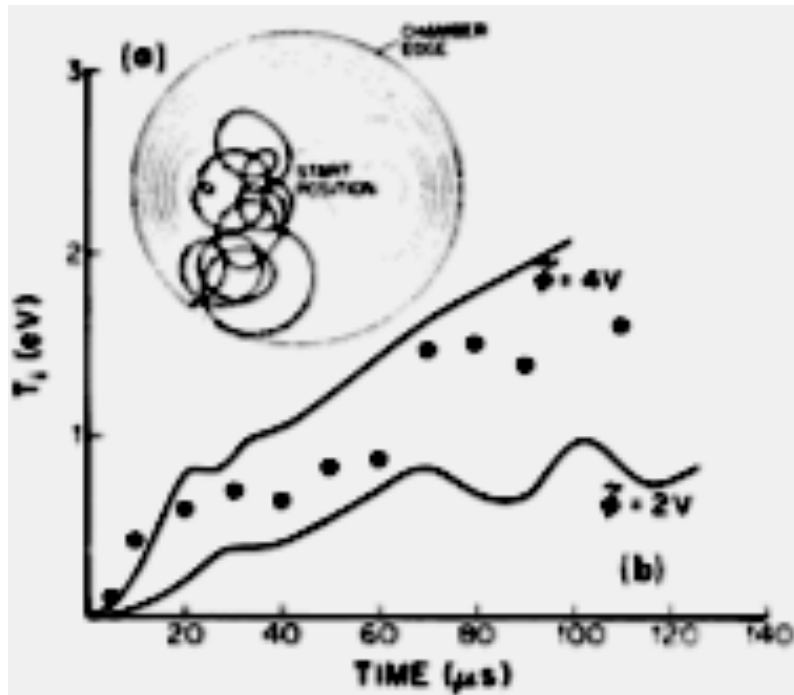


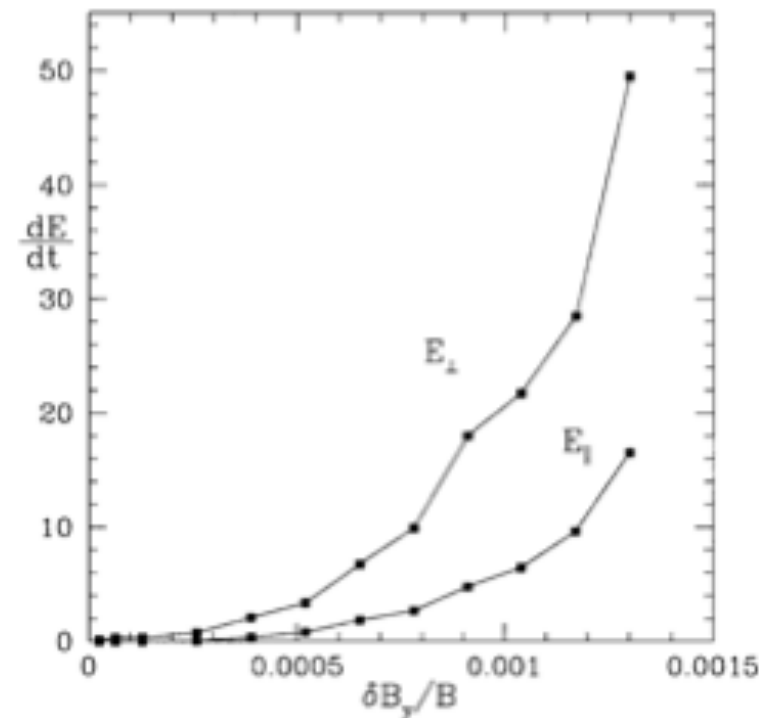
*AE Antenna Research Plan (Sketch)

- Low power (<1 kW) stability and coupling studies
 - Use existing and upgraded *AE antennae
 - Measure linear damping rate for TAE to benchmark NOVA.
 - Measure spectrum, linear damping rate of GAE and CAE (only unstable modes currently seen).
- Evaluate what is required for more active experiments
 - Power requirements
 - Antenna requirements
- Higher power experiments
 - Stochastic ion heating
 - Enhanced electron thermal transport (T_e profile control)
 - Control of fast ion population with *AE (TAE, CAE, GAE)

Stochastic Ion Heating needs mode amplitude of order $\delta B/B \approx 1\%$



- Stochastic ion heating has been experimentally demonstrated
 - McChesney et al, PRL **59** (1987) 1436.



- Simulations for NSTX find CAE stochastic heating at order $\delta B/B \approx 1\%$.
- Based on measured damping rate, need $\approx 1.5\text{MW}$ to reach $\delta B/B \approx 1\%$.

This is opportunity for first upgrade of *AE antenna, prepare amps, controls, matching network

- Existing 5-turn radial antenna installed for 2011 run
- No HHFW straps in 2014; add second *AE antenna for 2014 run.
- Either different design (poloidal coil to couple to compressional wave?),
- or second antenna for spectrum control.
- ... or one antenna for TAE and a second for GAE & CAE.

