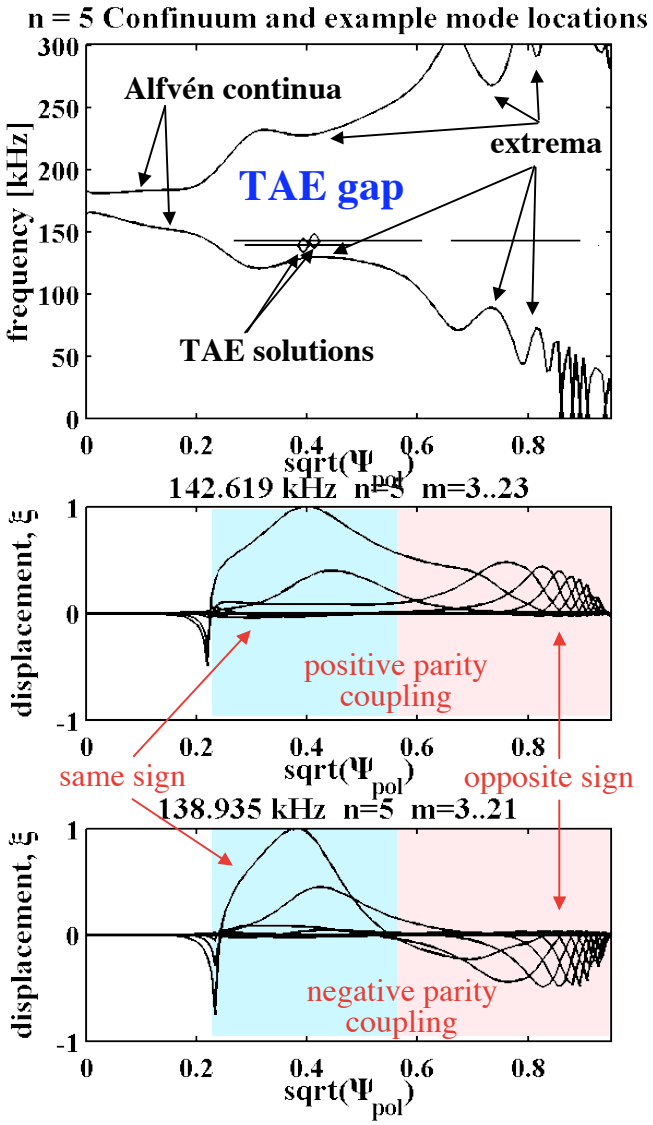
Magnetic and rotation shear, aspect ratio may allow control of eigenmode structure and avalanche transport

- At high β and ε, eigenmodes have broad poloidal spectrum and radial extent $\Rightarrow$ *avalanches* (multiple fast-ion resonances)
- Structure results from *linear coupling* of "local extremum modes" (e.g. "pure" TAEs and AC/RSAEs)
- Experimental knobs allow *control of coupling* $\Rightarrow$ control of structure and avalanche transport
  - high $\varepsilon \Rightarrow$ stronger toroidicity coupling
  - coupling requires degenerate "local mode" natural frequencies – rotation shear give relative Doppler shift
  - Edge magnetic shear controls number and spacing of edge extrema - high shear gives many extrema



Proposed experiments: parameter scans to modify eigenmode structure and avalanche transport

- Parameters scans:
  - Rotation shear – use n = 3 non-resonant breaking
  - Edge magnetic shear – edge q scan
  - ε – Similar plasmas, except ε, in NSTX and DIII-D
    - ε scan has already been done, but without reversed shear
- Key results of scans:
  - Eigenmode structure measurement – comprise with NOVA-K modeling
  - Onset threshold and level of avalanche transport – compare with NOVA-K and ORBIT modeling
- Use modeling (NOVA-K and ORBIT) to design scans – i.e. what should be held constant during scan?
  - Caveat: NOVA-K includes rotation shear *only* as Doppler shift – significance of other shear effects unknown