

NSTX APS invited presentation ideas

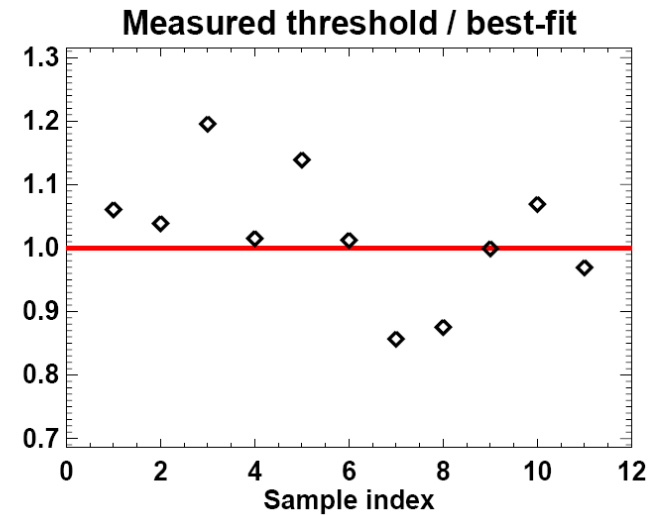
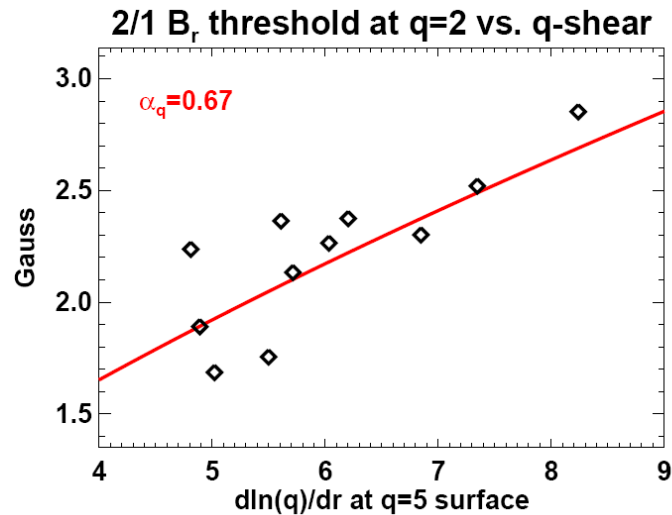
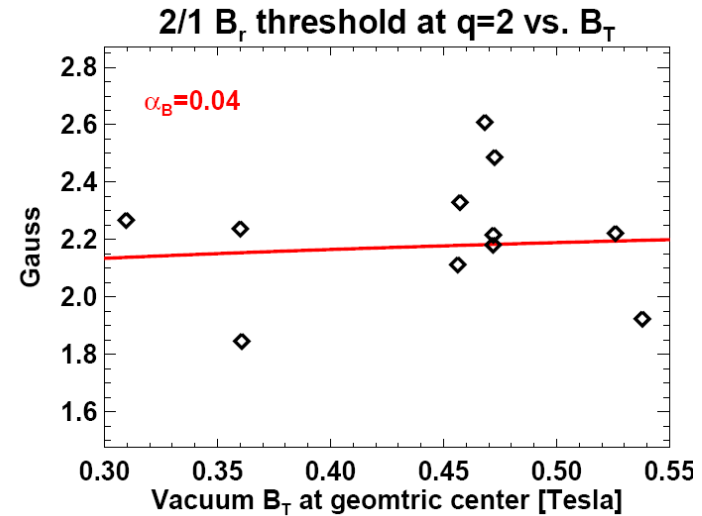
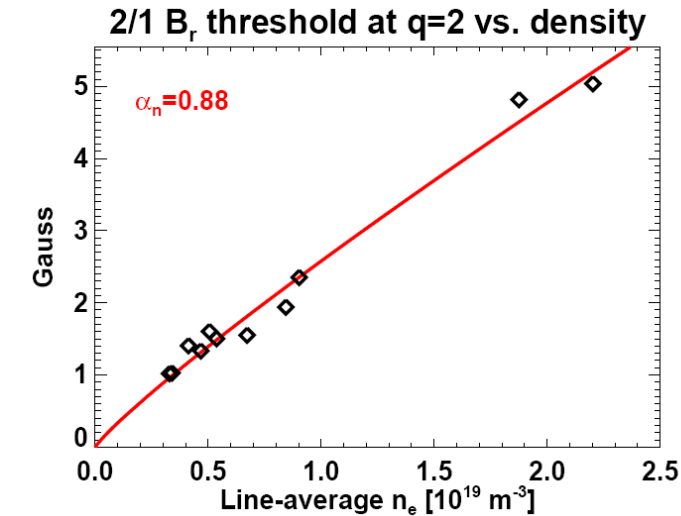
- Possible titles:

- “Locked modes and error field effects in ST plasmas”... or
- “Advances in understanding ST plasma response to 3D B-fields”

Possible outline

1. NSTX locked mode data
 1. scaling vs. n , B , q
 2. Size scaling - implications for ITER
 3. JK Park - IPEC analysis of plasma response for locked modes – J_{sing} scaling
 4. Importance of poloidal mode coupling – apparent in LM scaling data
2. Dynamic error field correction and RFA (high- β effects)
 1. LM correction studies indicate plasma responds to PF from shifted TF – doesn't follow TF – low- A effect? (could use VMEC help w/ this)
 2. Role of toroidicity in kinetic-damping – trapped-particle bounce times strongly modified by low- A – should impact RFA, DEFC, and critical rotation
 3. Implement work of D. Swanson/A. Egan into MARS-F calculations
3. Simulation of NSTX RMP experiments with XGC – Chang (NYU)
 1. Complements similar analysis done for DIII-D
 2. Need to see results first...

Locked mode data obtained in 2007 allows completion of scaling studies and subsequent analysis (but still need MSE)



Best fit to data includes variation of q-shear near edge - consistent with observation of importance of poloidal mode coupling from IPEC modeling

- Above no-wall limit, DEFC system responds to amplified error field
- Amplification determined by RWM damping rate
- (semi-kinetic) damping rate predicted to depend on τ_{pass} , τ_{bounce}

τ_{pass} and τ_{bounce} decrease by almost factor of 2 near boundary at low-A
 Impacts damping and RFA predictions – will compare to NSTX DEFC data

