

Overview XP 455

Error-field studies using tearing modes and mode control coils

- Study interaction of locked and rotating tearing modes with new mode control coils
 - Try to modify locking during I_p ramp
 - Vary coil current amplitude and polarity
 - Determine threshold density vs. applied B-field
 - Extend results into flat-top
 - Extend coil current pulse and scan coil current amplitude
 - scan density if possible
 - Study effect of applied B-field on rotating TM
 - Operate just above density threshold
 - Scan field amplitude and beam power
 - Document mode excitation and locking vs. B and initial rotation

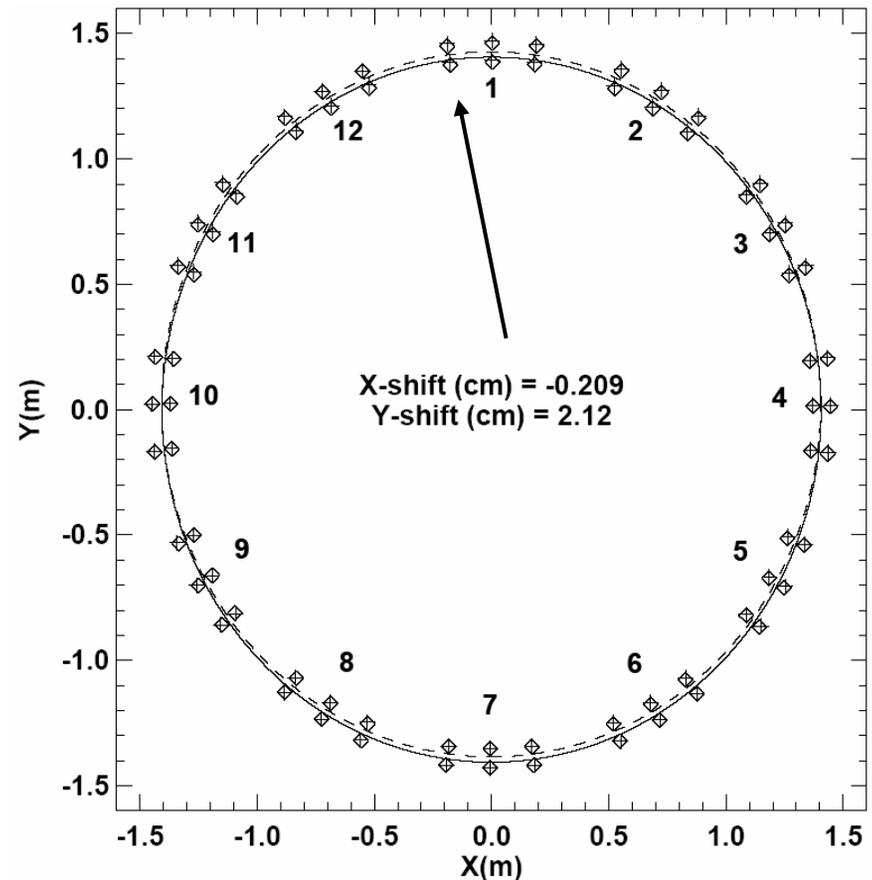
What is the intrinsic error field in NSTX?

- Locking much less of an issue since PF5 circularization
 - But, TMs still often lock to a few preferred locations
- Only PF5 has been measured and “circularized” – other PFs may have issues
- Another possible source is shift in vessel & plates relative to machine centerline

Primary passive plates
apparently lie on circle
shifted from machine centerline

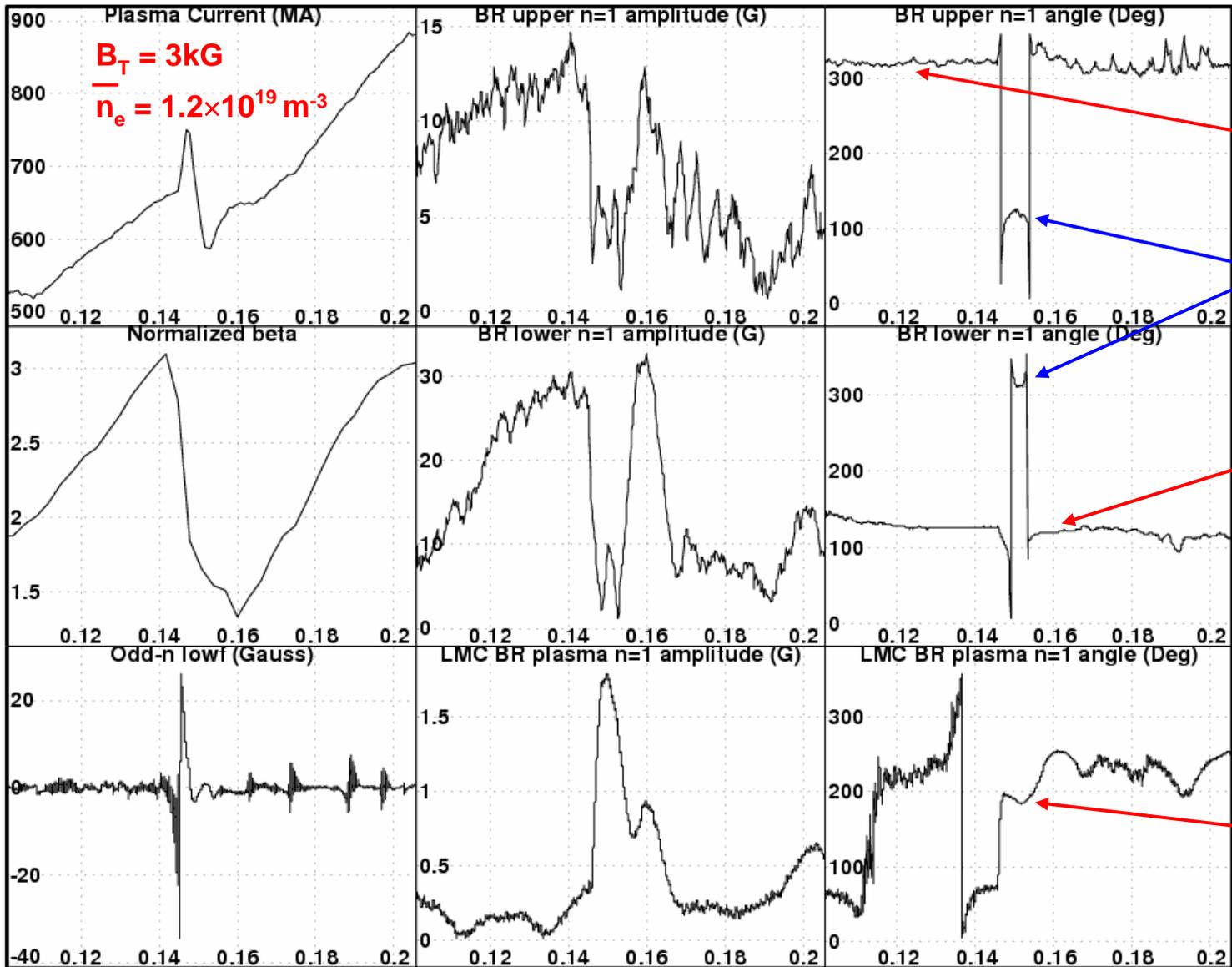
Also affects interpretation
of signals from B_R & B_P sensors
mounted on passive plates

Need to re-measure plate
centering during the next outage

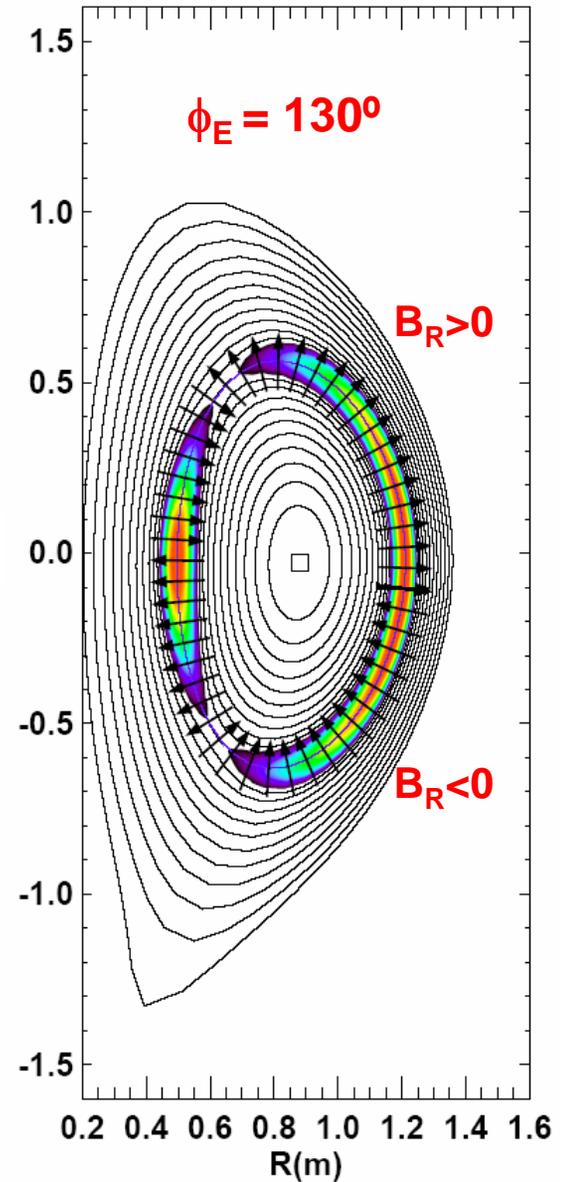
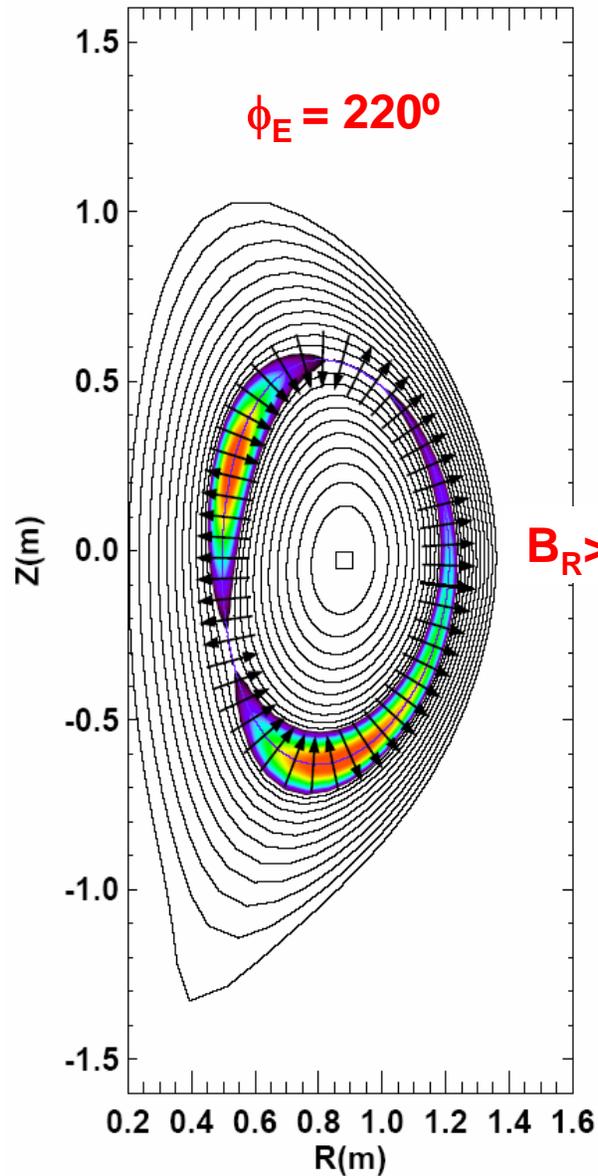
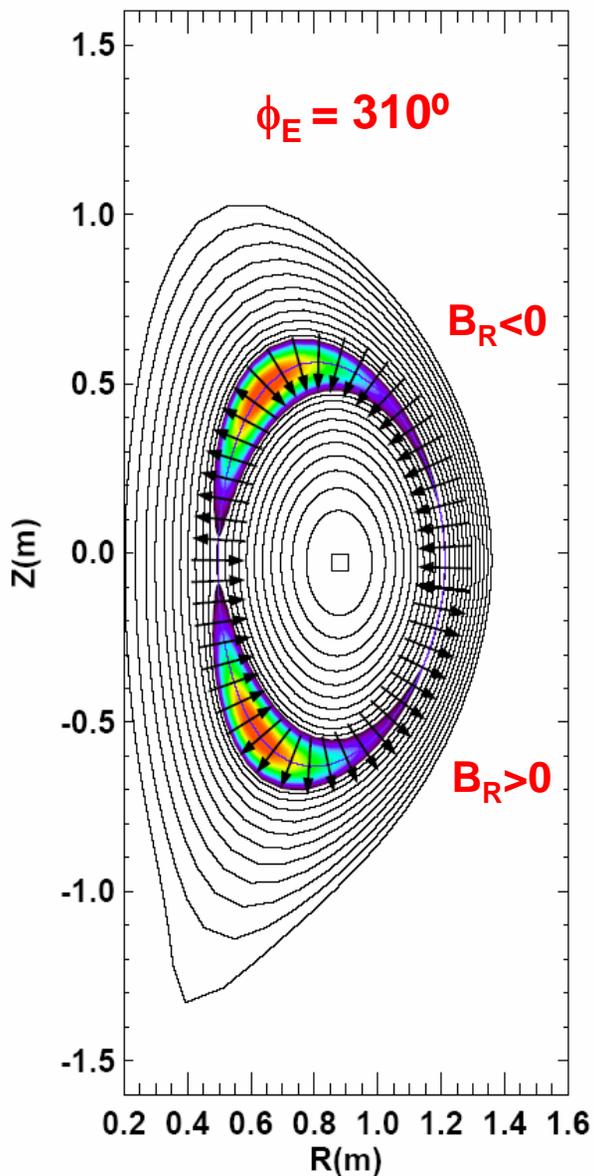


Part 1 - low- n_e locking during I_p ramp

NSTX RWM/EF BR n=1 Modes 113266

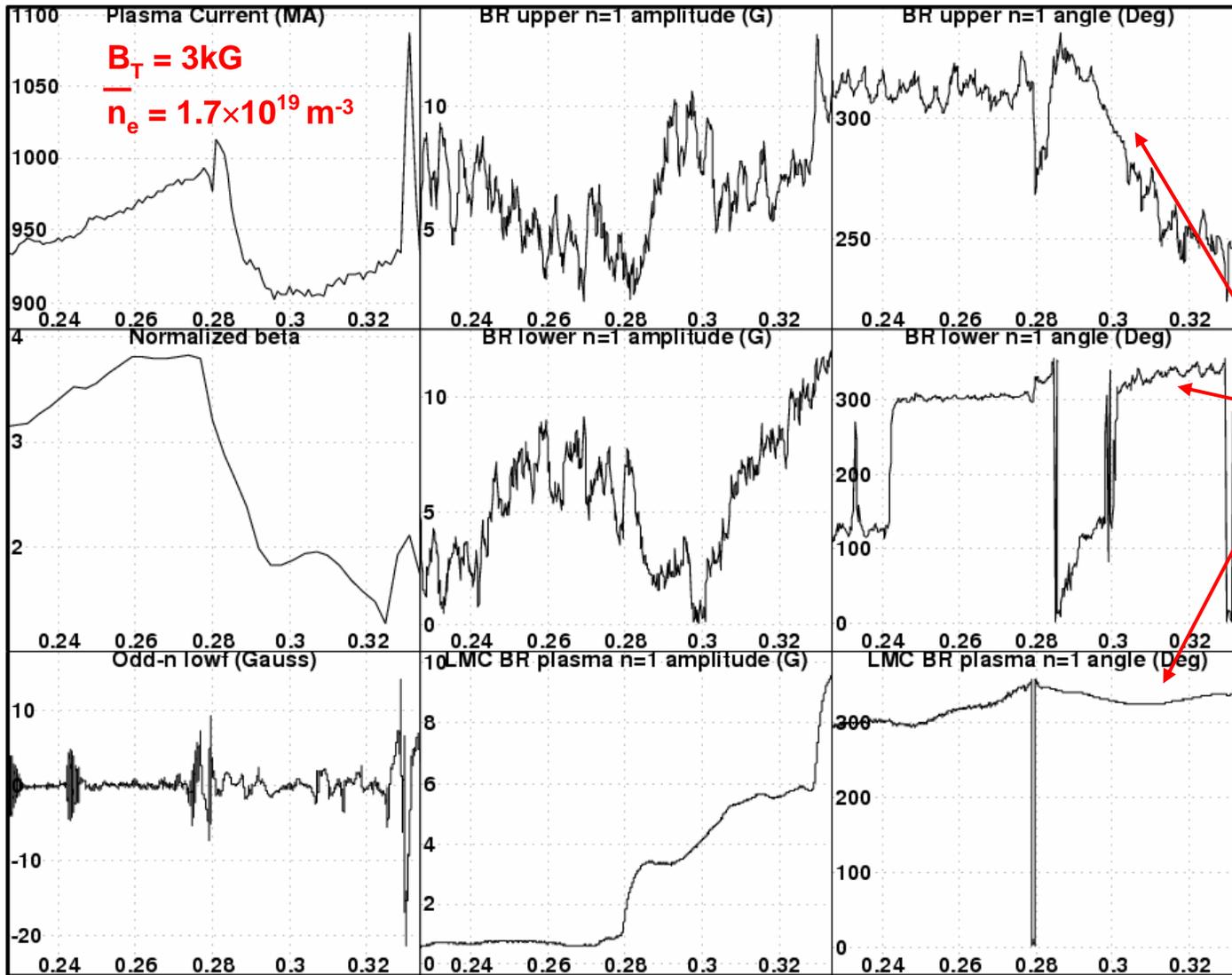


Data suggests island locked with O-point near $Z=0$, $\phi_{\text{ENG}} \approx 130^\circ \Rightarrow$ apply B_R at $\phi_{\text{ENG}} \approx 240^\circ$ (H/I)



Part 2 - low- n_e locking during I_p flat-top

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Toroidal angles similar...

Different helicity mode - 1/1?

Not clear applied field can match helicity...

Part 3 - higher- n_e rotating mode during I_p flat-top

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