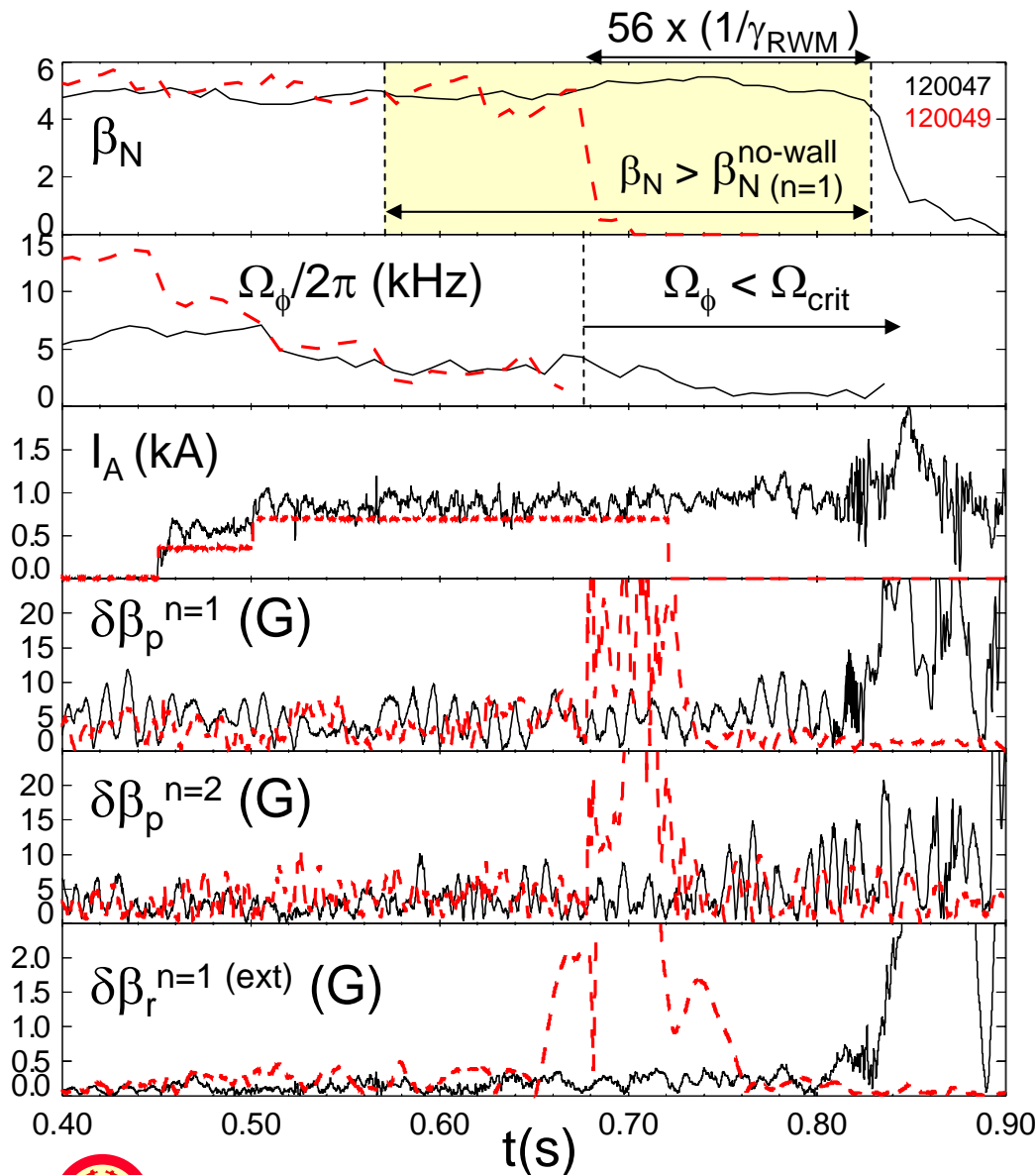


APS 2006 invited talk submission – Active RWM Stabilization in High Beta, Low Rotation Plasmas

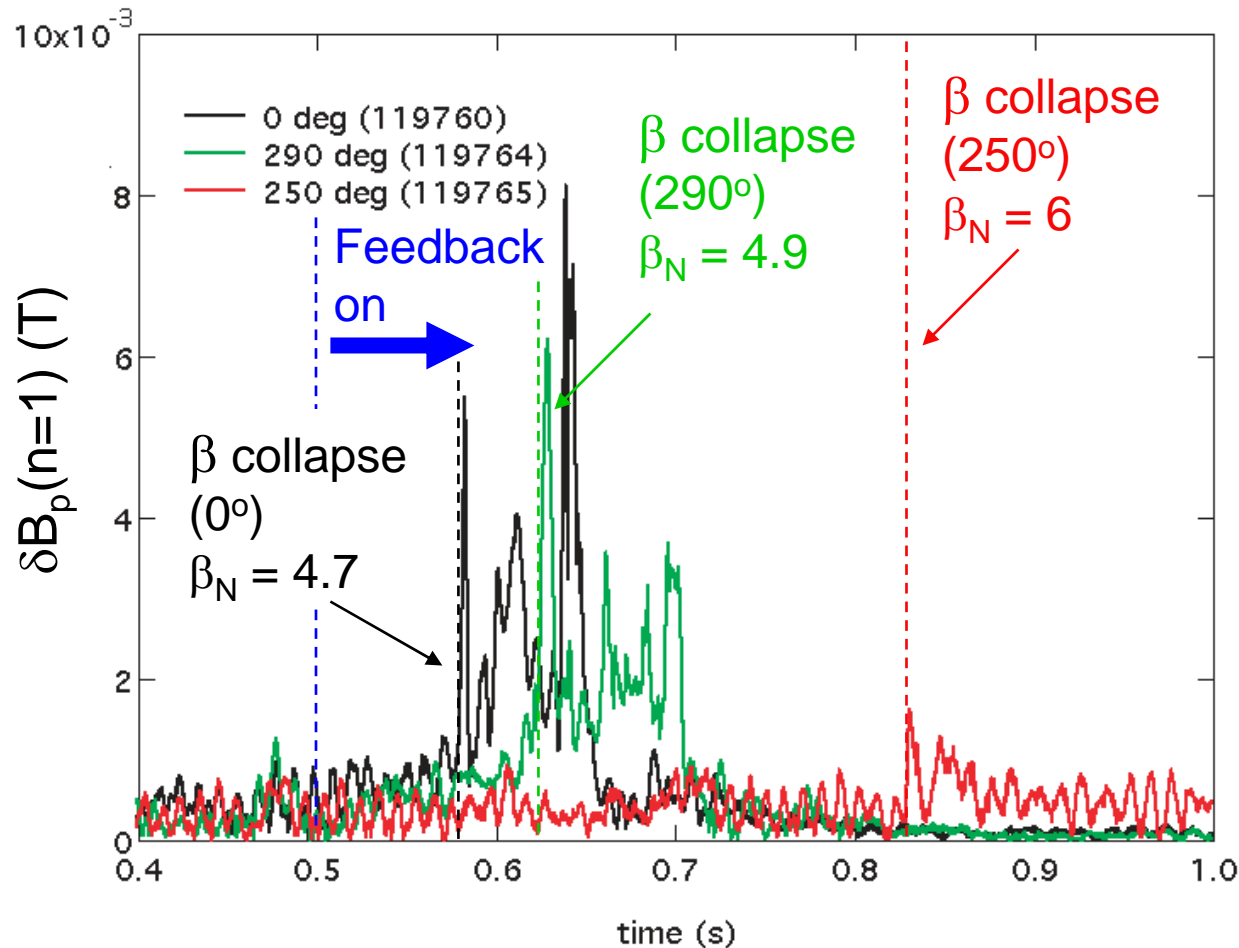
- ❑ First active stabilization of the pressure-driven RWM in a low aspect ratio tokamak
 - ❑ Demonstration of positive/negative feedback vs. phase and gain
- ❑ Stabilization of a low rotation plasma – ITER relevance
 - ❑ $\Omega_{\phi}/\Omega_{\text{crit}} \sim 1/4$; in range of predicted ITER rotation
 - ❑ System geometry similar to ITER
 - ❑ Rotation profile reduction/variation gives insight into RWM stabilization mechanism
- ❑ Significant $n = 2$ observed in $n=1$ active stabilized cases
- ❑ Mode rigidity violated in certain cases
 - ❑ Mode rigidity observed in DIII-D; assumed in RWM calculations made in the community
 - ❑ New observation demonstrates need for “multi-mode” calculation in future theoretical investigations

RWM stabilized at low rotation for longer than $50/\gamma_{\text{RWM}}$



- ❑ Reduction of Ω_ϕ by non-resonant $n = 3$ magnetic braking
 - ❑ Due to neoclassical toroidal viscosity
 - ❑ In ITER Ω_ϕ range
- ❑ Significant $n = 2$ amplitude during active stabilization
- ❑ Mode rigidity violated in certain cases
- ❑ Stabilized for longer than published DIII-D result

Varying RWM feedback relative phase demonstrates positive/negative feedback



Phase scan

- Varied through 360°, finer scan in 270° range; 225° appears to be “best”
- Positive feedback (destabilizing) in range ~ 90° - 290°
- n = 3 braking required to generate RWM when phase set to most favorable settings