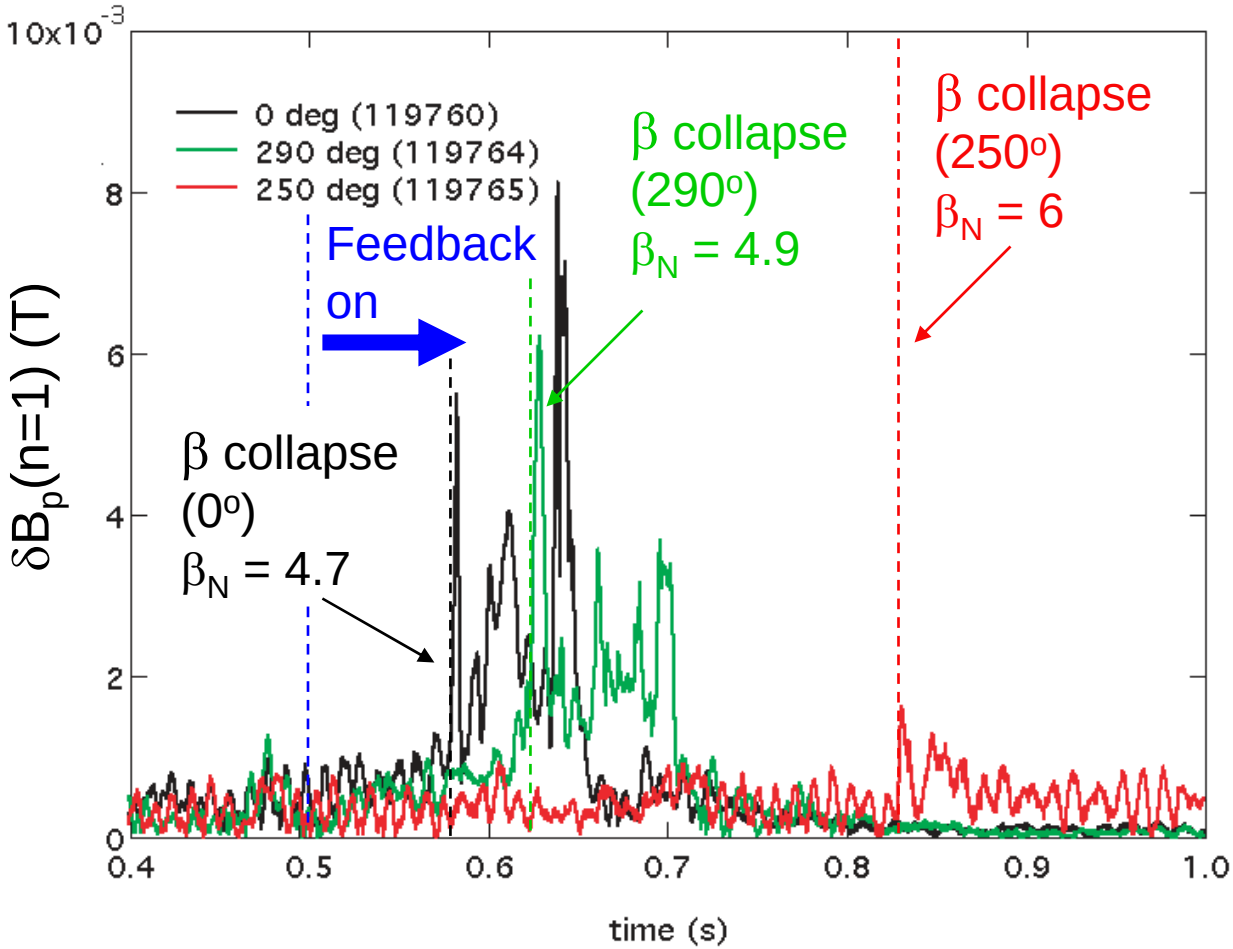
XP615: Active Stabilization of the Resistive Wall Mode at Low Aspect Ratio

- Goals (Part I):
  - Operate new RWM feedback system on 0.9–1.0 MA DND target
    - All aspects of RWM control system / RWM sensors worked well.
    - Good target plasmas with wide n=1 free window; high β_N up to 6.
    - Both locked/rotating RFA/RWM were observed/tracked by feedback.
  - Vary RWM feedback phase/gain to show control system influence
    - I_p = 1.0 MA target showed “best” phase <~ 270^o
    - I_p = 0.9 MA target more conclusive / finer scan; best phase = 225^o
    - “Best” phase depends on whether mode is rotating or not
  - Reduce plasma rotation with n = 3 braking to excite RWM if needed
    - RFA observed / RWM excited without braking in most cases
    - I_p = 0.9 MA target with phase = 250^o, 225^o required braking to excite mode

Setting RWM feedback relative phase in the range ~ 250° superior for longer pulse, higher β_N vs. ~ 0°



- Phase scan
  - Varied through 360°, finer scan in 270° range; 225° appears to be "best"
  - n = 3 braking required to generate RWM when phase set to most favorable settings

Generated relatively low rotation plasmas at high $\beta_N \sim 5.7$