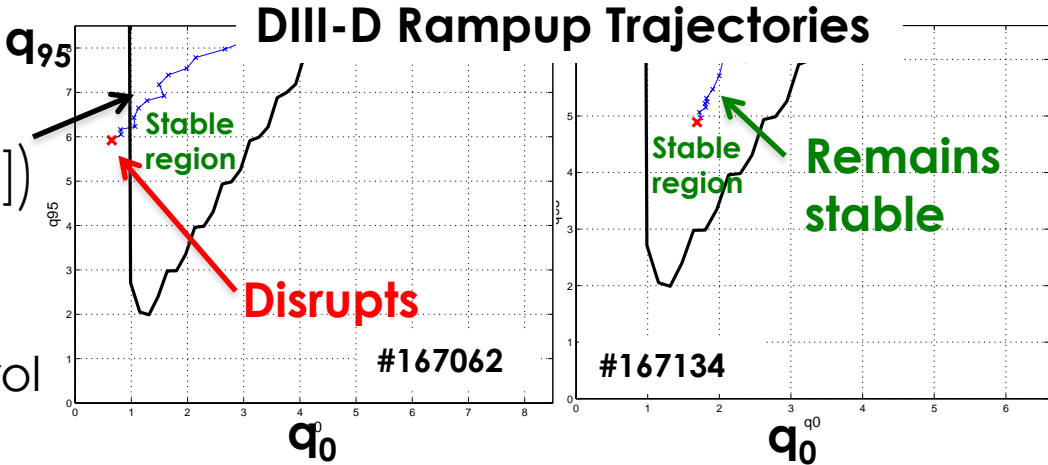# GA PCS Design Studies for ITER Include Analytic Ideal MHD Boundary and Real-time Error Field Correction Algorithm

- **Approximate ideal MHD stability boundary:**

$$q_a \gg \frac{1}{q_0^{20}} - 0.5 + 2q_0 + 0.2\sin\left(4p\left[q_0 - 0.5\right]\right)$$

  – Validated with DIII-D data

  – Enables study of active control to maintain stability, prevent disruption

DIII-D Rampup Trajectories

- **Real-time Error Field Correction**

  – Extremum-Seeking algorithm

  – Varies correction field amplitude phase to maximize plasma rotation

  – Automatically finds optimal correction (if enough rotation…)