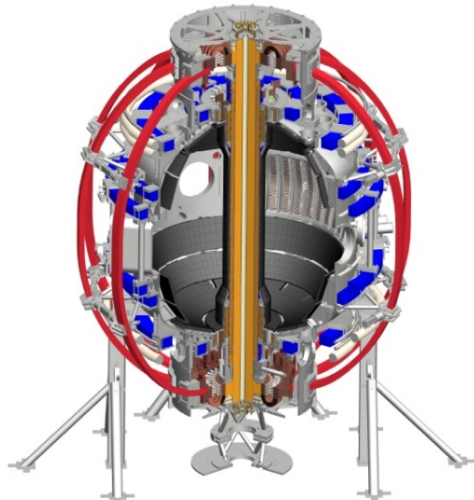


rtEFIT/SOFLUX and beam control XMPs/XPs

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rtEFIT/ISOFLUX XMPs and XPs

- **XMP:** Gap and squareness control with ISOFLUX
 - Reconfigure rtEFIT for NSTX-U and compare stand alone/`in the background` rtEFITs to offline EFITs
 - Introduce ISOFLUX control for short durations, tune gains one coil at a time, repeat for inner wall limited, SN, DN
- **XP:** κ vs. I_i , vertical stability optimization
 - Study achievable elongation as function of internal inductance
 - Vary internal inductance by changing flat top plasma current, ramp rate, beam power distribution
 - Maximize achievable elongation by optimizing vertical stability control
 - Determine primary cause of closed loop instability
 - Coil voltage limits, measurements/observer, latency, nonlinearity
 - Study benefit of SPAs as an additional actuator
 - **First month?:** Parts of this XP can be moved up if vertical stability is an issue early on

Beam control XMPs and XPs

- **XMP:** Beam and β PCS control
 - Commission total and independent power control algorithm
 - Verify rtEFIT β_N (and li) calculation
 - Commission algorithms for control (pre-processing, PID, state-space)
- **XP:** Variation of q profile and li with beam tangency
 - TRANSP analysis of beam current drive
 - Identify scenarios that are good candidates for control
 - Effect of beam modulation, system identification for control design
 - **First month?: Need profile diagnostics, phases without MHD**
- **XP:** Combined β_N and li control
 - Demonstrate control of β_N and li using beam power modulation
 - Reject initial condition errors, vary β_N at fixed li, maintain β_N and li as shape is changed
 - **First month?: Need rtEFIT, PCS control of beams**