NSTX-U

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Characterize plasma near planned plenum entrance position

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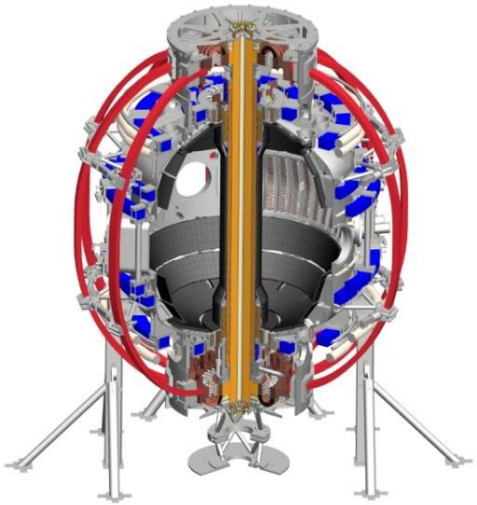
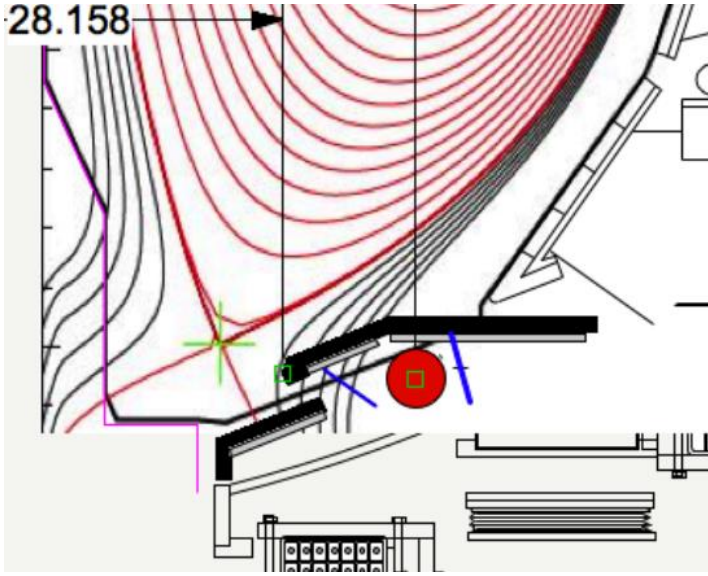
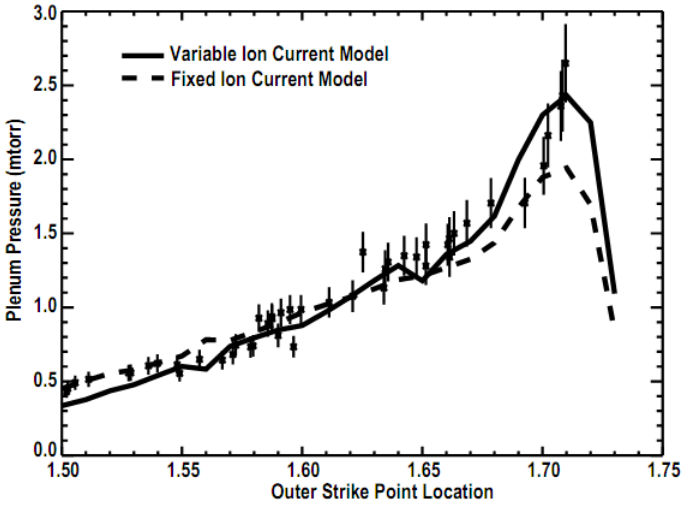


Cryo pump performance is sensitive to plasma parameters near pump entrance

- Physics design of NSTX-U cryo is based on the DIII-D design of pumping in the SOL
- Achievable plenum pressure is strongly dependent on the plasma parameters near the plenum entrance
  - Predicted by analytic modeling
  - Confirmed by DIII-D experiments
  - Results in sensitivity to OSP position
- To make meaningful predictions, we need to know n_e, T_e, particle flux near where the entrance is likely to be
  - Strong assumptions used to project in NSTX-U
    - Ip scaling of SOL width for heat flux
    - Assume T_e~15 eV
  - Sanity check needed using NSTX-U measurements to confirm physics design





Maingi, NF 99

Proposal: run with OSP near planned pump entrance during B phase

- Conventional ELMy + cryo scenario is backup should particle control with lithium prove too challenging
  - Important to get data during B phase of NSTX-U ops
- Cross-TSG $I_p/B_t/P_{NBI}$ scans should provide most of the data needed to confirm cryo projections
  - Provided IRTV, probes are working/running
  - Probably restricted to shapes with OSP on inner divertor
- Proposal aims for data that is unlikely to be gathered via piggybacking during early operations
  - Primary target is impact of strike point position on pumping (plasma parameters near planned cryo entrance (at R~0.72)
  - Run downward biased shape with OSP on bullnose tile
  - Scan OSP outwards to R~0.75 (high-Z shape?)
  - Other scans (I_p, P, f_{exp}) would be nice but lower priority