

Connecting MAPP measurements to the PFC conditions at the outer strike point

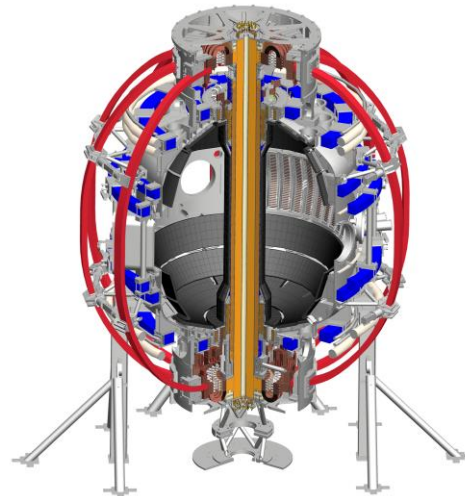
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 NSTX Upgrade



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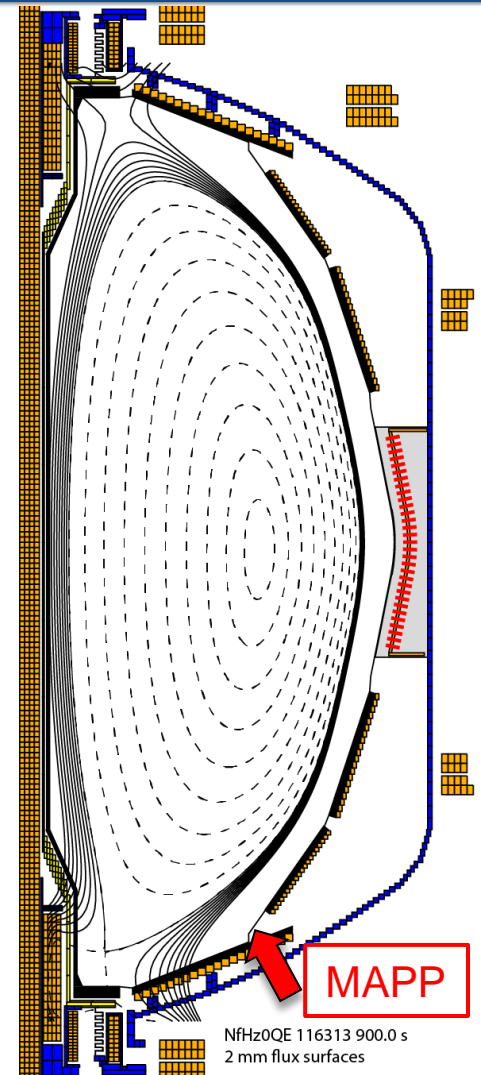
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Goal: establish a connection between MAPP and conditions at the outer strike point

- MAPP located in far SOL ($R \sim 100$ cm)
 - Typical outer strike point, $R \sim 45$ -50 cm
 - ~ 100 x difference in incident particle flux
 - Can MAPP be relevant to OSP conditions?
- In FY15, XPS ('non-destructive') MAPP capabilities will be limited:
 - Surface elemental composition (~ 5 nm) post-discharge (effect of ELMs, dust, disruptions?)
 - No information on D, He or chemical functionalities
 - Remote operation between shots?
- Goal: Relate post-exposure XPS elemental composition to material mixing from spectroscopy: C, Li, O sputtering, D retention
 - at MAPP-head, Row 4 tiles, outer strike point



Strategy: compare surface composition from spectroscopy and from MAPP probe

- Experimental plan (piggy-back):
 - Expose MAPP to lithium evaporation and plasma discharge
 - XPS in between shots (~10 min), evaporation (10 min.) after XPS
 - Spectroscopy (at OSP, MAPP head, adjacent tile) + UEDGE/ERO modeling
 - estimate surface composition and evolution based on material mixing, compare with elemental composition from MAPP
 - Assess evolution during discharge
- Questions to be addressed:
 - Is evolution at MAPP location consistent with OSP?
 - Is sputtering dominated by material mixing or chemical effects?

Additional requirements and collaboration/publication strategy

- Additional requirements/notes:
 - Benefit from one ATJ sample with same history as the PFCs
 - Need remote MAPP operation between shots
 - Suited to be run with the 'Introduction of lithium XP'
 - **Clearest change in divertor sputtering/retention characteristics**
 - Proof of principle MAPP imaging capabilities tested on LTX
- Collab. + publication strategy:
 - Theory support: J.P. Allain
 - MAPP: J.P. Allain, C. Skinner
 - UEDGE+ERO by LLNL postdoc

MAPP imaging on LTX

