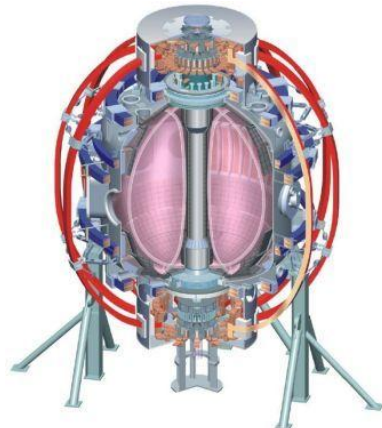


Impact of increased Li thickness on particle pumping and plasma performance

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Overview

- An important motivation for Mo tiles is to test high-Z as an improved substrate for liquid Li for high- δ plasmas
- Brief Description:
 - This XP will extend and scan the thickness of evaporated Li on the lower inner divertor to determine the impact of thicker non-passivated Li films on particle pumping, performance
- Background:
 - Typical Li evaporations deposit **a few tenths of a micron**
 - Increasing the evaporated thickness **towards 1 μm** (up to 10) microns is predicted to enhance pumping, reduce recycling
 - May lead to regimes of further reduced collisionality and/or turbulence and increased confinement
 - Supports Li and ASC milestones: R12-1, R12-3

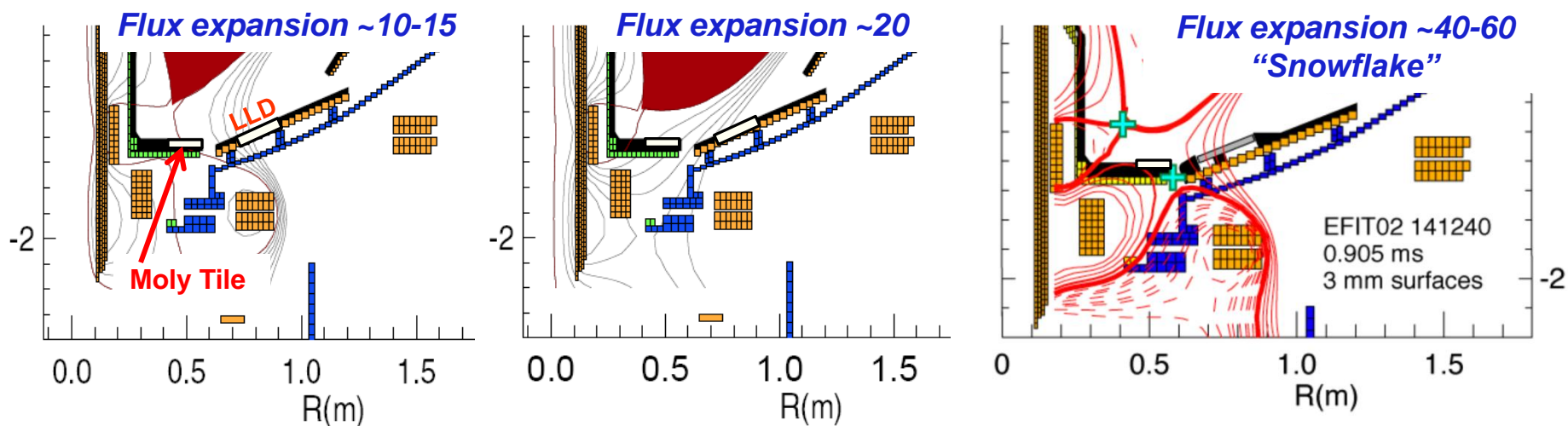
Experimental Approach

- Reproduce ELM-free ref. scenario: evap ~20mg/min for 10mins
- Increase evap. rate by factors of 1.5-2 step-wise to max value
- For each condition, achieve non-disruptive plasma conditions by modifying P_{NBI} , I_{P} , H-mode timing, fueling, etc
 - Optimization will both assist and benefit from ASC milestone R12-3
- The flux expansion and/or strike-point sweeping (IBD and/or IBD+OBD) will be controlled and optimized to liquefy (but not over-evaporate) Li on the largest achievable surface area
- To enhance the global pumping achieved in this experiment, it may also be combined with diffusive lithium coatings (TBD)
- The total amount of Li deposited must be controlled/minimized
 - Avoid adverse impact on LiTER and shutter systems and/or other experiments
 - Highest evap portions of this experiment may be best suited for end of 2012 run
- **Progress possible w/ $1\mu\text{m}$ \rightarrow ~80mg/min for 20mins for few hrs**

Outline of Experimental Plan:

(Request 2.5 run days, 1 run day minimum)

- Assess impact of flux expansion on thick Li evolution, pumping
 - Compare/validate predicted tile front-face temperature evolution to IR
 - Compare plasma pumping, particle inventories across shapes



- Compare $f_{\text{exp}} \sim 20$ IBD to OBD w/ 2 strike-pts on Mo

- Shot count:

- 1-1.5 days development, couple to diffusive Li
- 1+ days for scans of flux-expansion, strike-point location, sweeping and IBD vs. OBD variation

