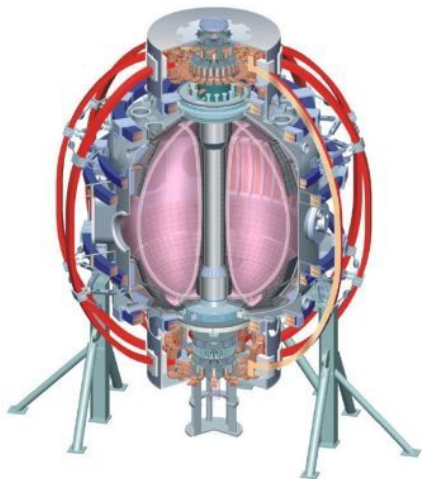# Validation of DEGAS 2 Model for Li – He Diffusive Evaporation

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Motivation & Background

- Urgent need for ELM control research for ITER,
  - Encourage development of "impurity reduction in Li-ELM-free scenarios."

- Proposed diffusive Li evaporation into helium last year,
  - Coat larger fraction of graphite tiles,
  - Impurity source should be reduced, if due to sputtering from graphite.

- Used DEGAS 2 to optimize sequence of He pressures.

- Corresponding XP 951 yielded disappointing results,
  - Follow-on proposal from Skinner?

- Focus here on validating DEGAS 2 model.

DEGAS 2 Modeling of Li – He Evaporation

- DEGAS 2 model:
  - 3-D vacuum vessel,
  - LiTER velocity distribution,
  - Li + He elastic scattering,
  - PMI: Li stick to surfaces.

- Construct sequence of evaporations at 3 pressures to provide minimum coating everywhere,
  - With Li mfp's: 0.5, 1.0, and 3.1 m.

- Will validate model against XP 951 QMB data,
  - But, had only one QMB.

1 @ 0.032 mtorr / 2 @ 0.1 mtorr / 2 @ 0.2 mtorr
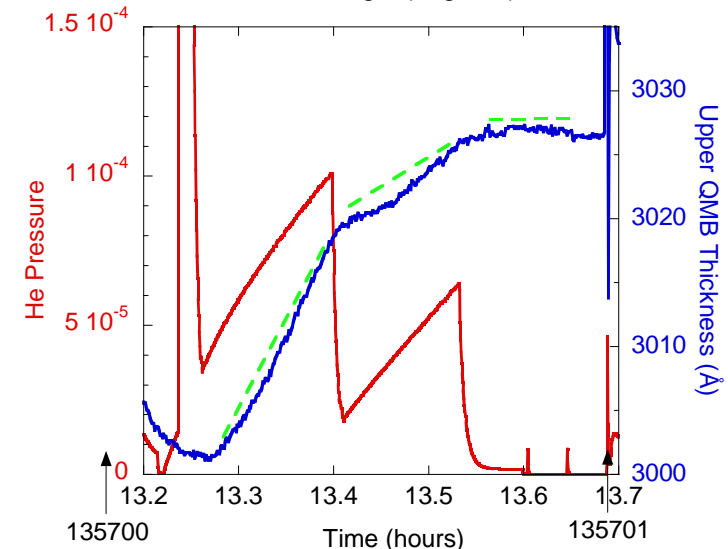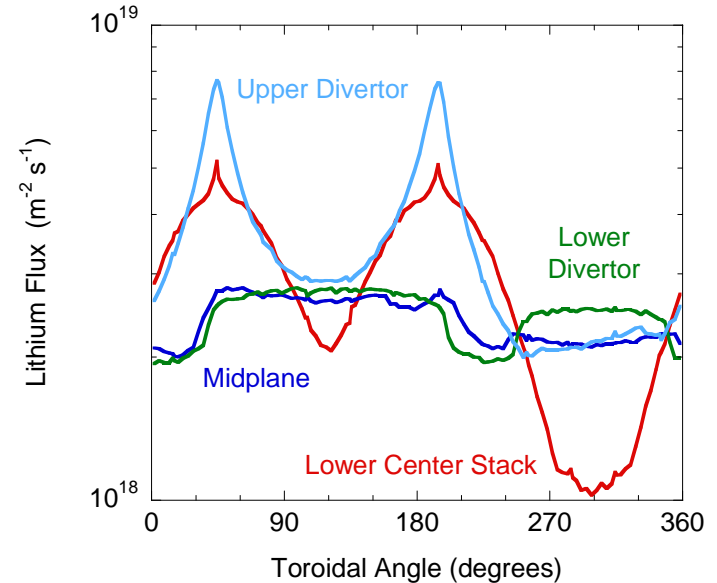
Dedicated Evaporations Would Provide More Discriminating Test

- Test toroidal dependence by operating LiTERs separately.

- Use multiple QMBs to test poloidal dependence.

- High pressures most sensitive to Li + He cross section,
  - & Low pressures sensitive to details in LiTER velocity distribution.
  - $\Rightarrow$ Should be able to test these model components separately.

- If comparison of QMB data with DEGAS 2 simulations unsatisfactory, may be able to calibrate model to give good match,
  - $\Rightarrow$ Either way, get a tool that can be used for controlling Li deposition patterns.

- Propose sequence of dedicated evaporations to get these data,
  - Somewhere between 5 & 10.
  - Only rate is needed from QMB, so evaporations could be just a few minutes.
    - $\Rightarrow$ Piggyback on a normal evaporation sequence?
    - At end of day?