XPs to Investigate Effect of Lithium Pellets and Powder on H-Mode Performance with LPI

- How will Li Pellet Injection and Li Powder into LSN He discharges affect subsequent D LSN H-Mode discharges of the same shape?

1. What are the Li effects on H-mode performance?
   (previous LPI tested only L-mode)

2. What are the effects of Li intercalation/passivation on graphite?
   (by varying time to subsequent D discharge)

   20 Shots Li pellets

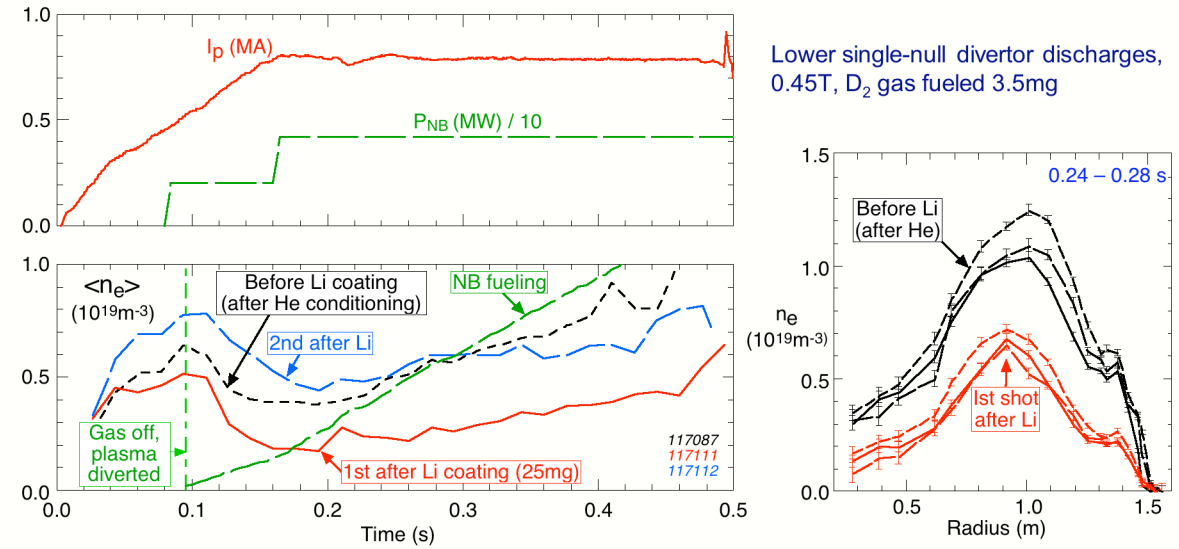
3. How does continuous Li powder injection into a D LSN H-mode discharge prior to NBI change density conditions and compare to the Li pellet results?

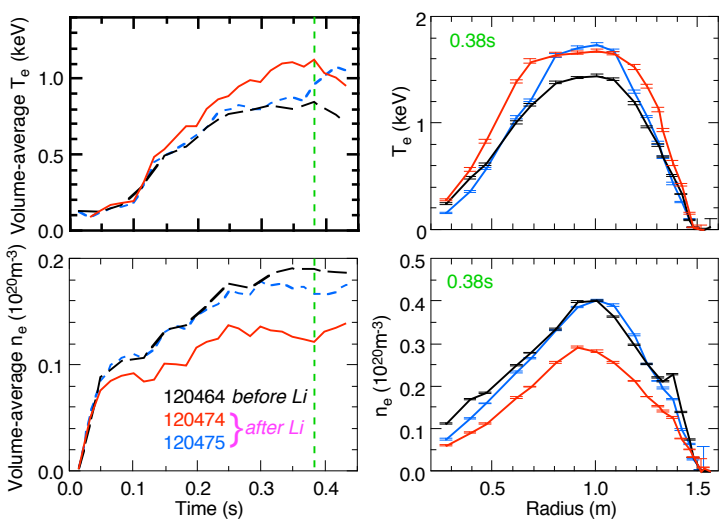
   13 Shots Li powder

- 33 shots total, 1.5 days

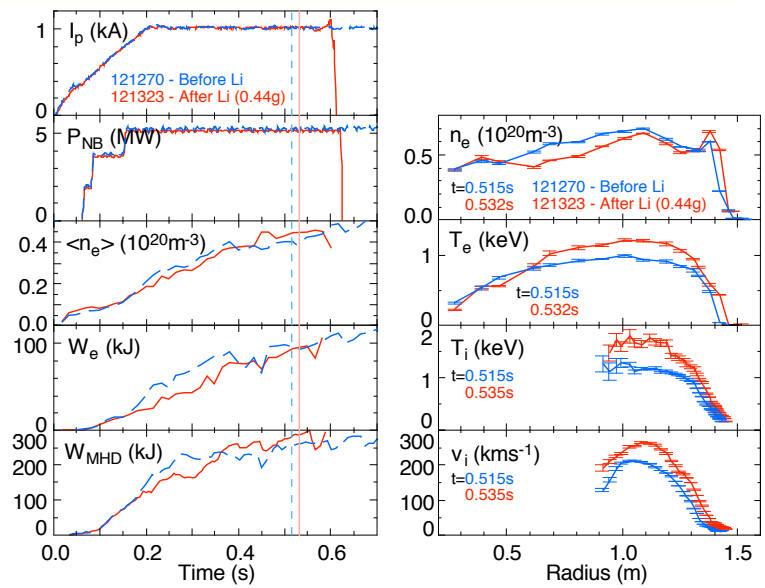
LPI at Low Density and LITER at Higher Density

LPI LSN L-mode





LITER-1c LSN L-mode



LITER-1c LSN H-mode

Shot List to Investigate Effect of Lithium Pellet Injection on H-Mode Performance with LPI

I. Injection of Li Pellets into Helium Discharges preceding D LSN H-Mode discharges, and then Test H-mode (FY05 LPI tested only L-mode at low density)

1. Run LSN D H-mode fiducial 121323-LD (if possible,Lower Density ~ $1x10^{19}$ m^{-3}) [1 shot]
2. Perform 6 Helium conditioning discharges until Dα change ~ becomes asymptotic (120468) [6 shots]
3. Run LSN D H-mode fiducial (121323-LD) [1 shot]
4. Run additional 2 Helium conditioning discharges (120468) to remove the fiducial gas [2 shots]
5. Inject 5 mg Li into Helium discharge 120468 [1 shot]
6. Run LSN D H-mode fiducial 121323-LD [3 shots]
7. If no effect, repeat by injecting 15 mg Li via 5 mg into 3 Helium discharges 120468 [3 shots]
8. Run LSN D H-mode fiducial 121323-LD [3 shots]

<u>20 shots</u>

Shot List to Investigate Effect of Lithium Powder Injection on H-Mode Performance with LPI

2. Injection of Li Powder into D LSN H-Mode discharges prior to NBI and compare with the Li Pellet results

1. Run LSN D H-mode fiducial & prior to NBI, inject 5 mg Li (121323) [1 shot]
   - If n_e and plasma parameters change, run LSN D H-mode fiducial with no LiPowder, and measure longevity of effect. [2 shots]

2. If n_e and plasma parameters changed, increase the LiPowder mass and repeat #1 until effect is optimized. [3 shots]

3. If n_e and plasma parameters changed but plasma flattop perturbed decrease LiPowder mass until conditions are optimized. [3 shots]

4. Adopt best shot, increase velocity x2. [1 shot]

5. Using the same shot, decrease the velocity x0.5. [1 shot]

6. Adopt best shot, move injection timing later, and repeat. [1 shot]

7. Move injection timing earlier and repeat. [1 shot]

13 shots