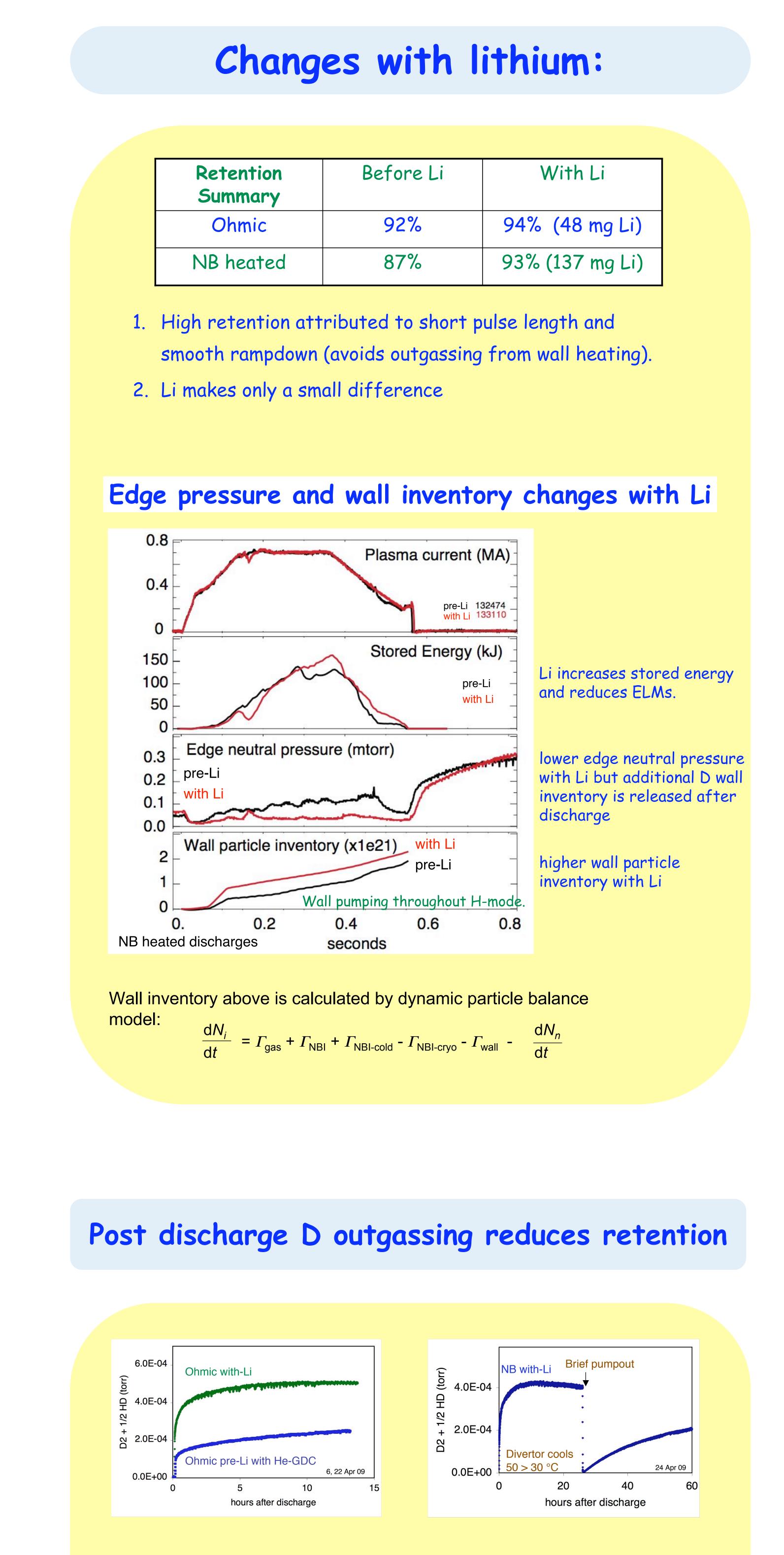


Print at 120% 54" x 72" paper size. email Apr21 "we are providing 1.2 m by 2.4 m poster boards"

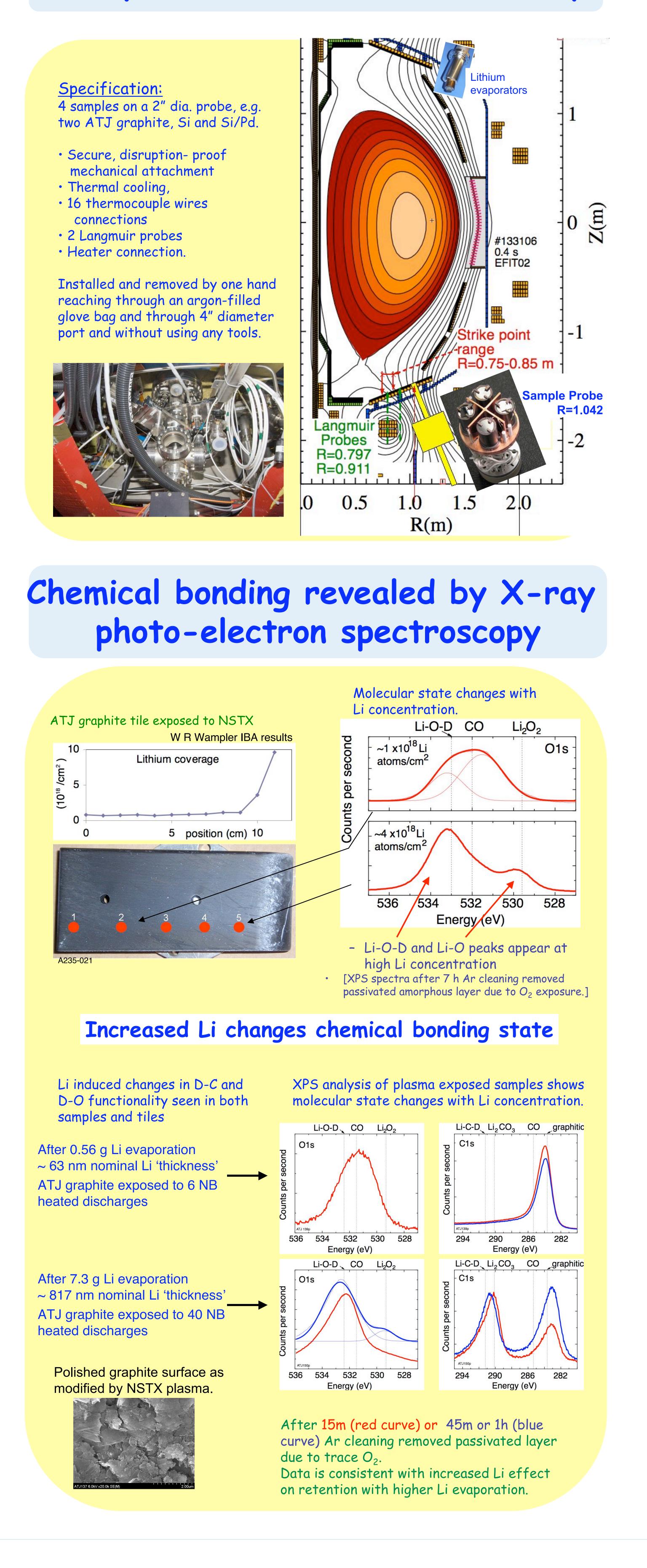
## **Deuterium Retention in NSTX with Lithium Conditioning**

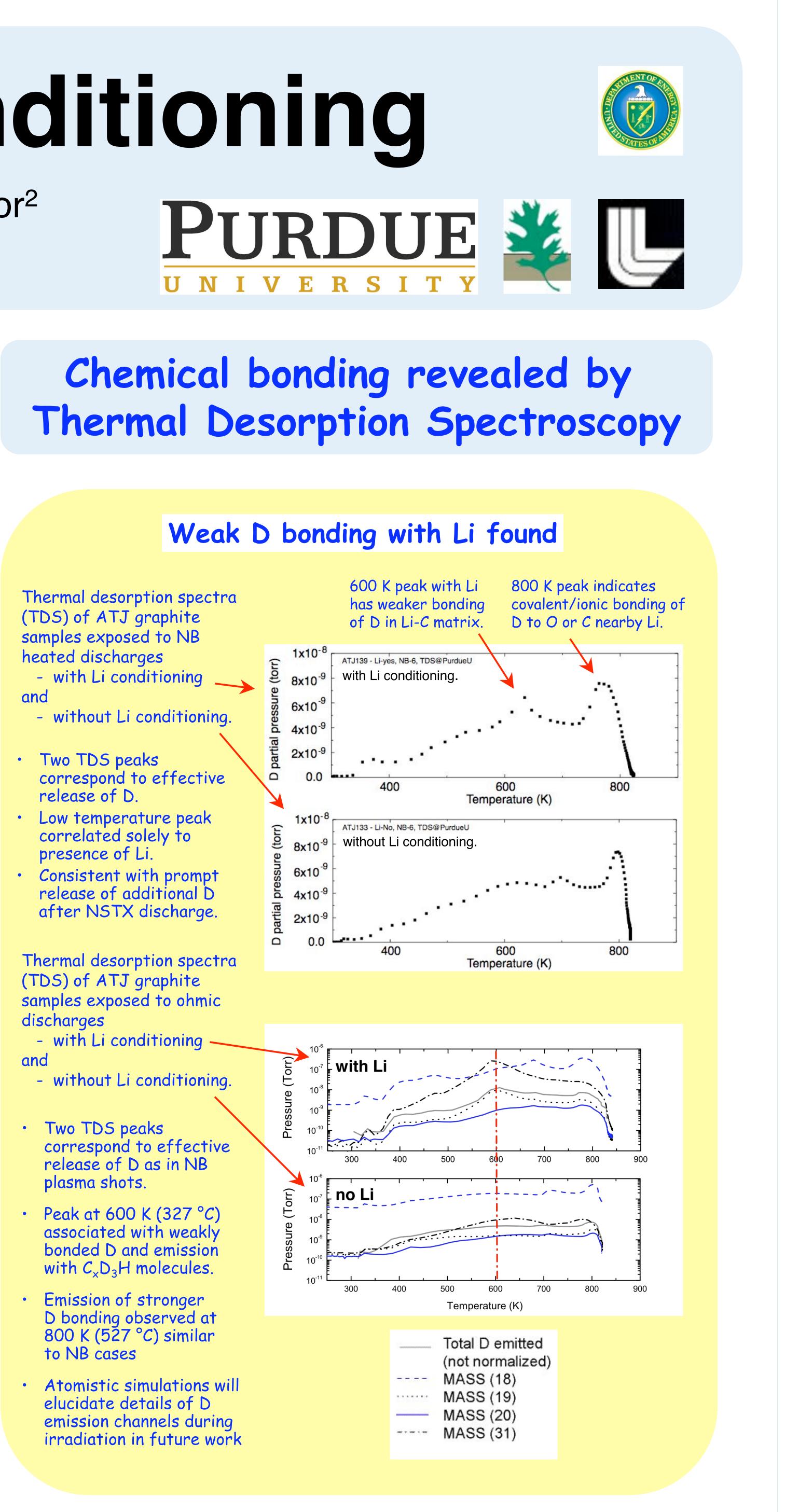
C. H. Skinner<sup>1</sup>, J.P. Allain<sup>2</sup>, W. Blanchard<sup>1</sup>, H.W. Kugel<sup>1</sup>, R. Maingi<sup>3</sup>, A.L. Roquemore<sup>1</sup>, V. Soukhanovskii<sup>4</sup>, C.N. Taylor<sup>2</sup> <sup>1</sup>Princeton Plasma Physics Laboratory, <sup>2</sup>Purdue University, <sup>3</sup>Oak Ridge National Laboratory, <sup>4</sup>Lawrence Livermore National Laboratory. 19th International Conference on Plasma Surface Interactions, San Diego, CA, 24-28 May 2010.



- Pump valves closed for up to 72 h to integrate outgassing.
- Pre-Li case had intershot He-GDC that depleted D from wall.
- D<sub>2</sub> rate of rise is pressure dependent
  wall pumping of D<sub>2</sub> as divertor cools.
- Long time scale for outgassing (> weeks) makes long-term retention % uncertain.

## PMI probe elucidates Li chemistry





## Summary and conclusions:

Interesting correlations between gas balance and surface analysis

GAS BALANCE:	SURFACE ANALYSIS
Deuterium Retention high ~ 90% at end of discharge.	PMI probe commissioned - permits on-vessel surface analysis.
Retention higher with Li, difference increases with Li concentration.	XPS shows D atoms are weakly bound in regions near lithium atoms bound to either oxygen or the carbon matrix. Chemical bonding changes with Li concentration.
Additional D retained with Li is released promptly after discharge	Weak D bonding with Li conditioning observed in TDS.
Outgassing reduces retention over next minutes - weeks.	Upgrade to PMI (MAPP) probe with on-vessel XPS, DRS planned for 2011.

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