

Surface studies to support particle control

- Lithium conditioning will be important tool for density control for optimizing and controlling high non-inductive current-drive fraction scenarios in NSTX-U.
- Fundamental 'engineering' data for designing effective Li-PFCs is sorely needed:
 - D uptake vs. D fluence (saturation) on solid / liquid Li surfaces.
 - D uptake vs. surface temperature
 - D uptake vs. surface contamination
 - Chemical state of Li on carbon and Mo surfaces vs. all of the above.
- Modest incremental support in recommissioning surface analysis equipment at PPPL and installation of additional components to allow sample transfer and higher D fluxes, would accelerate the above studies
- Facility will also be invaluable for surface analysis of samples from NSTX-U.

Bottom line:

- *Surface data key to achieving NSTX-U mission*
- *It will accelerate innovation and reduce the risk for Li-PFCs in NSTX-U.*
- *Minimizing innovative Li-PFC risk is also critical for NSTX-U's missions in Advanced Scenarios, Boundary Physics, Macroscopic stability, Turbulence, Startup, Waves...*

Surface analysis

- We have access on-site to custom surface analysis equipment operated by Prof. Bruce Koel that is already contributing relevant information on surface chemistry (LRTSG talk '*Initial results for reactivity of lithium films on a molybdenum substrate*' 26 Jan 2012).
- Information on Li-PFC materials is needed to inform NSTX-U PFC material decisions in late 2011.
- Some PPPL support but progress limited by manpower.
- Technical help in commissioning instruments would help get data in time (contrast JET-ILW data late for ITER PFC decisions).
- Details to be negotiated.

