Proposal Submission for NSTX Research Forum 2001

Title	CDX-U Liquid Lithium Results and Plans for Future Research
First Name and Initial(s)	Richard J.
Last Name	Majeski
Email address	RMAJESKI@PPPL.GOV
Mailing address	MS-17, PPPL
Phone number	(609) 243-3112
Institution	PPPL
Co-authors	R. Kaita, M. Boaz, P. Efthimion, D. Hoffman, B. Jones, H. Kugel, J. Menard, T. Munsat, S. Raftopoulos, V. Soukhanovskii, J. Spaleta, G. Taylor, J. Timberlake, R. Woolley, L. Zakharov, *PPPL*, M. Finkenthal, D. Stutman, *Johns Hopkins University*, S. Luckhardt, R. Doerner, G. Antar, *UCSD*, R. Maingi, *ORNL*, S. Molesa, *Hope College*, M. Maiorano, *Rutgers University*
Choose only one topical session by inserting X (Please use separate forms for individual proposals)	**2001 Research Program** (esynakowski@pppl.gov) __ET1: Macroscopic Stability __ET2: Transport & Turbulence __ET3: High Harmonic Fast Wave & Electron Bernstein Wave __ET4: Coaxial Helicity Injection __ET5: Boundary Physics **2002-2005 Research Opportunities** (mpeng@pppl.gov) __TG1: Noninductive Startup X TG2: Heating, Current Drive & Fueling __TG3: Macroscopic Stability __TG4: Transport & Turbulence __TG5: Energetic Particle Physics __TG6: Multiphase Interface __TG7: General Plasma Science Research **Fluctuations Measurement** (esynakowski@pppl.gov) __Fluctuations Measurement proposals

Select a presentation option by inserting X:

X Oral presentation in person
__Remote presentation via ShowStation and speakerphone
__Ask discussion leader to include in discussion
__No need to present, but include in meeting summaries
__Attend Forum only

Special Requests for your proposal (projector type, time constraints, etc.):

None.

Please write a one-page description of your presentation:

The initial results of experiments involving the use of liquid lithium as a plasma facing component in the Current Drive Experiment - Upgrade (CDX-U) will be reported. In CDX-U a solid or liquid lithium covered rail limiter was introduced as the primary limiting surface for spherical torus discharges.

Deuterium recycling was observed to be reduced, but so far not eliminated, for glow discharge-cleaned lithium surfaces. Comparisons of plasmas limited with solid and liquid lithium, using the lithium rail limiter, were documented with spectroscopic diagnostics. No deleterious effects on discharge performance were observed, and the plasma-liquid metal interaction resulted in only a modest increase in the impurity content and radiated power.

A full toroidal belt limiter, consisting of a 10 cm wide trough filled with liquid lithium, is being installed in CDX-U. This will increase the lithium surface area to 1600 cm^2 and the in-vessel volume to approximately 0.5 liter. Experiments with this limiter will investigate the behavior of ST plasmas which are interacting primarily with a large lithium surface, and the response of the lithium to ST operating conditions.

The Advanced Liquid Plasma-facing Surface (ALPS) and Advanced Power Extraction (APEX) groups are proposing a liquid lithium module for NSTX as a particle control and power handling concept. As part of the design effort, the CDX-U experiments will provide important information on lithium handling, lithium surface conditioning, plasma characteristics in the presence of lithium, and the behavior of the lithium itself in the ST environment.

Please return this document via e-mail attachment to jrobinson@pppl.gov and jsavino@pppl.gov.

Please e-mail questions or comments to the organizers listed above.