Proposal and Attendance Form for NSTX Research Forum 2001

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Please write in the boxes below a one-page abstract of your proposal to be presented:

Title: Transport Studies and MHD Mode Visualization using Laser Blow-Off Impurity Injector Proposed for NSTX.

Abstract:
Theoretical and experimental assessment of the role of neoclassical particle transport in various confinement modes and heating regimes is important to programmatic goals of NSTX. We propose to built and mount a low cost laser blow-off (LBO) impurity injection system, which can be used for particle transport and MHD characterization. For impurity transport studies, trace amounts of low and medium non-recycling impurities (such as lithium, fluorine, aluminum, and calcium) are injected into a plasma discharge in a non-perturbative manner and the temporal and spatial evolution of their emission is recorded spectroscopically. Using this method and the existing NSTX spectroscopic diagnostics, impurity transport regimes can be characterized in a passive, "piggy-back" manner. Utilization of multicomponent LBO targets, for example CaF_2, in combination with selective bandpass filters in the SXR imaging diagnostics, will enable us to study core impurity transport and characterize edge transport phenomena (transport barriers and pedestals) simultaneously. Similarly, core and edge MHD modes can be highlighted by SXR emission from trapped impurities of medium and low Z. Other applications of the LBO system include electron transport studies with the Electron Bernstein Wave (EBW) radiometer by means of "cold wave" propagation measurements, and soft X-ray and X-ray spectroscopic measurements of interest to the recently launched astrophysical missions and atomic structure theory.

Impurity transport analysis will include interpretive simulations using time dependent impurity transport code MIST and predictive simulations with the neoclassical NCLASS code, which is presently being integrated into NSTX MDS Plus system. Of particular interest are the impurity transport measurements in the L- and H-mode discharges, OH and HHFW heated discharges, identification of spherical tori - specific transport and confinement regimes and their correlation with particle collisionalities and electron and ion temperature and

density profiles.

Choose only one topical session by inserting X for each proposal (Use separate forms for separate proposals)	**2000 Results** (mbell@pppl.gov) **& 2001 Research Program** (esynakowski@pppl.gov) (Please submit by January 10, 2001) __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) (Please submit by January 11, 2001) __TG1: Noninductive Startup __TG2: Heating, Current Drive & Fueling __TG3: Macroscopic Stability X_TG4: Transport & Turbulence __TG5: Energetic Particle Physics __TG6: Multiphase Interface (Boundary Physics) **Fluctuations Measurement** (esynakowski@pppl.gov) (Please submit by January 10, 2001) __Fluctuations Measurement proposals

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

Please return this document via e-mail attachment to jrobinson@pppl.gov, jsavino@pppl.gov, and the corresponding organizer listed above. Please e-mail questions or comments to the organizers listed above.