# Proposal and Attendance Form for NSTX Research Forum 2001

| | |
|---|---|
| First Name and Initial(s) | Manfred L. |
| Last Name | Bitter |
| Email address | Bitter@pppl.gov |
| Mailing address | Princeton University, Plasma Physics Laboratory, James Forrestal Campus, P.O. Box 451, Princeton, NJ 08543 |
| Phone number | 609-243-2582 |
| Institution | Princeton University |
| Co-authors | K. W. Hill, L. Roquemore |

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

**Title: First Experimental Results from the NSTX Imaging X-ray Crystal Spectrometer**

**Abstract**: A high-resolution imaging X-ray crystal spectrometer- consisting of a spherically bent 110-quartz crystal, with a 2d-spacing of 4.913 Å and a radius of curvature of 375 cm, and position-sensitive multi-wire proportional counter in the Johann configuration – has recently been installed at NSTX and has been operating during the last experimental campaign. The instrument records spectra of heliumlike and lithiumlike argon, ArXVII and ArXVI, in the narrow wavelength range from 3.940 to 4.000 Å at a Bragg angle of 54°. Due to the imaging properties of the spherically bent crystal it is, in principle, possible to obtain, with use of an appropriate 2D detector, temporally and spatially resolved spectra of ArXVII and ArXVI in a direction perpendicular to the main diffraction plane (horizontal mid-plane of NSTX) and to measure radial profiles and *gradients* of the ion- and electron temperatures as well as the ionization equilibrium of the argon impurity ions.[1] The spatial resolution in the plasma is only determined by the height of the crystal, its radius of curvature and the Bragg angle. By providing spatially resolved spectra with only one crystal, the imaging spectrometer will solve a long-standing problem of X-ray spectroscopy. The spectrometer will therefore also be attractive as a diagnostic for future large tokamaks. Up to now the spectrometer is equipped with a 1D detector. The installation of a 2D detector is planned for FY2002. The paper will present experimental results from plasmas with ohmical, neutral-beam and rf heating. The characteristics and diagnostic potential of a fully developed imaging X-ray crystal spectrometer will also be discussed.

[1]M. Bitter et al., Rev. Sci. Instrum. **70**, 292 (1999)

| | |
|---|---|
| Choose only one topical session by inserting X for each proposal<br>(Use separate forms for separate proposals) | **2000 Results** (mbell@pppl.gov)<br>**& 2001 Research Program** (esynakowski@pppl.gov)<br>(Please submit by January 10, 2001)<br>__ET1: Macroscopic Stability<br>**x**_ET2: Transport & Turbulence<br>__ET3: High Harmonic Fast Wave & Electron Bernstein Wave<br>__ET4: Coaxial Helicity Injection<br>__ET5: Boundary Physics<br>**2002-2005 Research Opportunities** (mpeng@pppl.gov)<br>(Please submit by January 11, 2001)<br>__TG1: Noninductive Startup<br>__TG2: Heating, Current Drive & Fueling<br>__TG3: Macroscopic Stability |

| | |
|---|---|
| | __TG4: Transport & Turbulence<br>__TG5: Energetic Particle Physics<br>__TG6: Multiphase Interface (Boundary Physics)<br>**Fluctuations Measurement** (esynakowski@pppl.gov)<br>(Please submit by January 10, 2001)<br>__Fluctuations Measurement proposals |

**Select a presentation option by inserting 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 (in person or with remote access)

**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.