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: ST Merging Experiments using Two Coaxial Helicity Sources

Abstract: In this proposal, two coaxial helicity sources will be used to initiate a new merging experiment in NSTX. Its goals are 1) high-power initial heating of ST by use of merging/reconnection (formation of high-beta ST), 2) current/pressure profile control of ST by use of merging/reconnection, 3) formation of FRC and ultra-high-beta ST (future) by use of two merging spheromaks with opposing helicity, and 4) study of magnetic reconnection in high Reinolds number. In the first stage experiment, we will use two existing coaxial plasma guns without additional hardware modification to start the first tentative FRC merging formation and magnetic reconnection research. Without the TF coil, slow field index control would be used to separate the merging/reconnection phase from the spheromak formation phase. Since this setup lacks balanced control of the two discharge currents, we hope to make 1) insulation of two outer divertor electrode plates from the vacuum vessel and 2) installation of two capacitor banks (~200kJ, 20kV) in the second stage experiment. In this stage, the high-power heating and profile control of ST will be mainly studied by use of ST merging. Since the divertor plates are floating, the center electrode would be the common ground and the divertor plates would be biased for ST merging. For the FRC merging formation, the currents in each of the circuits could now be individually controlled thus providing improved control over the spheromak formation and merging processes.

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 X_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 __TG4: Transport & Turbulence __TG5: Energetic Particle Physics __TG6: Multiphase Interface (Boundary Physics) __TG7: Plasma Science User Research **Fluctuations Measurement** (esynakowski@pppl.gov) (Please submit by January 10, 2001) __Fluctuations Measurement proposals

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