



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: Study of the Influence of Convective Impurity Transport on the Macroscopic Stability During the Disruptions and CHI at NSTX

Abstract:

Detailed studies of convective impurity transport in MHD-unstable modes of plasma discharge at T-11M tokamak have been performed recently with the use of fast multichannel radiation losses measuring system (MRLMS)^{1,2}. Unexpected very rapid (~10 μs) and effective penetration of light impurities into the plasma core has been observed. Low magnetic shear of classic high aspect ratio tokamak could be one of the possible reasons of this phenomenon. Low aspect ratio tokamaks are known to be more stable to MHD perturbations and disruptions. Detailed investigation of the nature of this stability is the main purpose of proposed researches of convective impurity transport in MHD-unstable modes and during CHI at NSTX.

The necessary equipment includes pinhole camera with 10x10 AXUV photodiode array installed into tangential midplane port, fast data acquisition system (~1 μs simultaneous sampling rate) and target-like impurity source (local limiter) made of low-Z materials (Li, Be, B, C). During CHI the material of electrodes will play role of the impurity source. Fast measurements of magnetic fluctuation and plasma turbulence in the same poloidal cross-section would be quite useful also for correlation analysis.

The studies will include observation, analysis and modeling of impurity UV emission profile evolution during initiated or spontaneous development of MHD perturbations. Anticipated results could be quite useful for the plasma conditioning and control of macroscopic stability at low aspect ratio tokamaks.

1. A.G.ALEKSEYEV, et al. "Fast multichannel plasma radiation losses measuring system" Plasma Devices & Operations, v.7 (1999), p.139.
2. S.V.MIRNOV, et al "Studies of the Origin of Rapid Impurity Penetration into the Plasma Core During the Disruptions in T-11M Tokamak" - 18th IAEA Fusion Energy Conference, Sorrento, Italy, 4 to 10 October 2000.

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| <p>Choose only one topical session by inserting X for each proposal (Use separate forms for separate proposals)</p> | <p>2000 Results (mbell@pppl.gov) & 2001 Research Program (esynakowski@pppl.gov) (Please submit by January 10, 2001)</p> <p><input type="checkbox"/> ET1: Macroscopic Stability <input type="checkbox"/> ET2: Transport & Turbulence <input type="checkbox"/> ET3: High Harmonic Fast Wave & Electron Bernstein Wave <input type="checkbox"/> ET4: Coaxial Helicity Injection <input type="checkbox"/> ET5: Boundary Physics</p> |
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| | <p>2002-2005 Research Opportunities (mpeng@pppl.gov) (Please submit by January 11, 2001)</p> <p><input checked="" type="checkbox"/> TG1: Noninductive Startup <input type="checkbox"/> TG2: Heating, Current Drive & Fueling <input type="checkbox"/> TG3: Macroscopic Stability <input type="checkbox"/> TG4: Transport & Turbulence <input type="checkbox"/> TG5: Energetic Particle Physics <input type="checkbox"/> TG6: Multiphase Interface (Boundary Physics)</p> <p>Fluctuations Measurement (esynakowski@pppl.gov) (Please submit by January 10, 2001)</p> <p><input type="checkbox"/> Fluctuations Measurement proposals</p> |
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