

Transport and Turbulence Experimental Task Group Planning Session

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2003 NSTX Research Opportunities Forum

Proposed research aligned with the 5-Year T&T plan

- **Global confinement**

H-mode scaling, A , β , ρ^* -scaling, MAST/DIII-D identity/similarity, role of rotation, role of q-profile (ITPA)

Kaye - Intra-machine aspect ratio scaling, H-mode scaling (engineering parameters), dimensionless scaling experiments

Synakowski - NSTX/DIII-D core transport similarity

- **Ion energy transport**

ITG role, ExB role, stochastic heating, μ -tearing ?

Kaye - Counter injection

Redi - Gyrokinetic microstability calculations for NSTX

- **Electron energy transport**

Electron ITBs, critical gradient, role of magnetic shear, μ -tearing, TEM ?

LeBlanc - Investigation of electron transport in NSTX

Stutman - Electron confinement in shear reversal/low n_e regime

Proposed research (continued)

- **Momentum transport**

NBI vs. RF, perturbative studies, T_e/T_i scaling

Ji - Study of angular momentum transport due to magnetic fluctuations by the dynamo probe head

- **Particle/impurity transport**

Perturbative measurements in H-mode and RF plasmas

Raman - CT injector as a tool for transport studies in NSTX

- **Fast ion confinement**

Losses and energy distribution of beam ions vs I_p , R_{tan} , gap

Darrow - Neutral beam ion confinement in NSTX

Medley - NPA measurement of the anisotropic NB energetic ion distribution and beam-ion profile

Proposed research (continued)

•Edge/ pedestal transport and fluctuations

Role of E_r in L-H transition , pedestal characterization,
DIII-D /MAST similarity/identity, fluctuations and convective
transport

Maingi - NSTX/MAST similarity - role of shape on L-H threshold,

NSTX/MAST similarity - role of fueling on L-H transition

NSTX/MAST/DIII-D similarity - pedestal characteristics

Evans - ELM suppression in NSTX with a stochastic boundary

Lee - Study of edge fluctuation and density formation by FIRE TIP

***Myra* - Blobs and convective transport in theory and experiment**

***Zweiben* - Gas Puff Imaging measurements in FY04**

***Peebles* - Core and edge turbulence measurements**

Special announcements

11 run days (+ 2-3 contingency ...)

FY04 Milestones on Transport and Turbulence:

Measure long wavelength turbulence in spherical torus plasmas in a range of plasma conditions

High τ_E regime with edge barrier (asses confinement)

Current drive (bootstrap current)

Call to XP planners:

Use predictive modeling (e.g., TRANSP) to optimize XPs