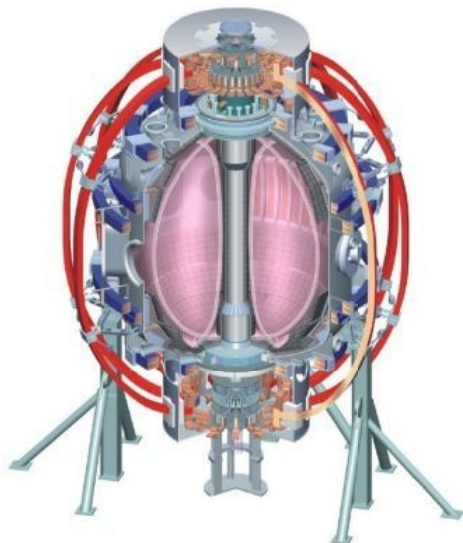


Transport & Turbulence 2009 Mid-run Assessment

Kevin Tritz, JHU
Stan Kaye, PPPL

and the NSTX Research Team

B318, LSB
June 17th, 2009



College W&M
Colorado Sch Mines
Columbia U
CompX
General Atomics
INEL
Johns Hopkins U
LANL
LLNL
Lodestar
MIT
Nova Photonics
New York U
Old Dominion U
ORNL
PPPL
PSI
Princeton U
Purdue U
SNL
Think Tank, Inc.
UC Davis
UC Irvine
UCLA
UCSD
U Colorado
U Illinois
U Maryland
U Rochester
U Washington
U Wisconsin

Culham Sci Ctr
U St. Andrews
York U
Chubu U
Fukui U
Hiroshima U
Hyogo U
Kyoto U
Kyushu U
Kyushu Tokai U
NIFS
Niigata U
U Tokyo
JAEA
Hebrew U
Ioffe Inst
RRC Kurchatov Inst
TRINITI
KBSI
KAIST
POSTECH
ASIPP
ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
ASCR, Czech Rep
U Quebec

2009 Research Forum T&T XP List

“Completed” XPs: (1/2 day requested)

Kaye	Beta degradation of confinement in weakly shaped plasmas	0.5 (Finished XP910)	
Kaye/Solomon	L-H threshold studies (Finished XP922 - 1, XP936 - 1/2)	(2 ITER+1) needs 1/2 day	
Maingi	Dependence of the L-H power threshold on X-point radius	1 (Finished XP909)	

Pending XPs: (2.5 days requested)

Solomon	Dependence of momentum and particle pinch on collisionality	1	
Tritz	Characterization of GAE modes	1	
Yuh	Sustained ITBs / H-Mode ITBs	0.5	0.5

Reduced Priority XPs: (2 days requested)

M. Bell	Negative-triangularity plasmas	0.5	0.5
R. Bell/Burrell	Comparison of impurity poloidal velocity on NSTX and D III-D	1	
Wong	Search for evidence of microtearing modes in NSTX	0.5	0.5

Newly Proposed XPs: (1.5 days requested)

D. Smith	k_r - k_θ isotropy of high-k fluctuations	0.5	
E. Mazzucato	Power spectrum of turbulent fluctuations in NSTX	1	
K.C. Lee	P_{LH} thresholds in reverse B_T	(reversed BT operation)	

4 T&T XPs Run and Completed

XP910: Kaye - Beta degradation of confinement in weakly shaped plasmas

Completed 1/2 day run

Little changed found in confinement dependence on beta:

(2006) $\kappa=2.1$, $\delta=0.6$, $\tau_{\text{Etot}} \sim \beta_T^{-0.13}$ (2009) $\kappa=1.9$, $\delta=0.5$, $\tau_{\text{Etot}} \sim \beta_T^{-0.2}$

XP922: Kaye - Ip scaling of L-H threshold power

Completed 1 day run

Strong P_{LH} scaling observed with Ip: $P_{\text{LH}} \sim 2\text{MW @ } 0.7\text{MA}$, $P_{\text{LH}} \sim 4\text{MW @ } 1\text{MA}$

XP910: Kaye - Effect of Rotation (n=3 braking) on P_{LH}

Completed 1/2 day run

P_{LH} increases with application of n=3 braking: $P_{\text{LH}} < 1\text{MW}$ (no braking), $P_{\text{LH}} > \sim 2\text{MW}$ (n=3 braking)

XP909: Maingi - Dependence of P_{LH} on X-point radius

Completed 1 day run

P_{LH} changes with X-point radius (triangularity): $P_{\text{LH}} \sim 1.1\text{MW @ } \delta=0.4$, $P_{\text{LH}} \sim 2.2\text{MW @ } \delta=0.55$, $\delta=0.7$

High Priority XPs Pending

Kaye - P_{LH} in D vs. He plasmas

1/2 day requested

Requires HHFW RF power

Solomon - momentum and particle pinch dependence on collisionality

1 day requested

Ready for full group review

Tritz - GAE effects on electron thermal transport

1 day requested (+1 day from WPI)

Waiting on diagnostic upgrades, lack of high-k remote will require ~3-4 controlled accesses

Yuh - Sustained/H-mode ITBs

1/2 day requested (+1/2 from ASC)

Requires HHFW RF Power

Other XPs Pending

M. Bell - Confinement in negative triangularity plasmas

1/2 day requested

feasibility issues, will look at recent x-point sweeping results

R. Bell/Burrell - Joint NSTX/DIII-D XP, comparison of poloidal velocity

1 day requested

DIII-D XP deferred until FY10, perhaps use 0.25-.5 day to establish baseline shot

Wong - Search for microtearing modes in NSTX

1/2 day requested

Waiting on data from new PHA diagnostic, issues with SXR coverage

Newly Proposed XPs

Smith - k_r - k_θ isotropy of high-k fluctuations

1/2 day requested

scan high-k system to change k_θ/k_r ratio, look for ETG fluctuation anisotropy (streamers)

Mazzucato - Investigate turbulent power spectrum on NSTX

1 day requested

Scan high-k system down to low $k_{\rho_s} \sim 1\text{cm}^{-1}$, better measure of exponent in the power spectrum

Reversed BT operation:

K.C. Lee - P_{LH} at reversed B_T operation

1/2-1 day requested

Compare P_{LH} in LSN/USN in reversed and normal B_T operation to measure grad-B effect on P_{LH}