

Run Summary for the FY10 and start of FY2011 NSTX Runs

College W&M
Colorado Sch Mines
Columbia U
Comp-X
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
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U Colorado
U Maryland
U Rochester
U Washington
U Wisconsin

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NSTX Results Review
Nov. 30 – Dec. 2, 2010

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

Very Successful & Productive NSTX Run

- **Start-up with new LLD, and no Boron, was successful.**
- **43 XPs were performed in 2010, 39 were completed.**
- **4 weeks of 2011 campaign completed with 23 XPs getting run time.**
- **10 supporting XMPs were completed in 15 run days.**
- **Operated successfully with new Molybdenum-coated Liquid Lithium Divertor plates.**

Run Usage (ASC & BP)

| ASC | XP # | Run Time | | TSG | Comments |
|------|---------|--------------|------------|------------|---|
| | | (days) | shots | | |
| | XP-1003 | 2.59 | 101 | done | Combined X-point height and OSP control |
| | XP-1004 | 1.87 | 73 | done | Application of early error field correction to advanced scenarios |
| | XP-1005 | 0.49 | 19R11-2 | done | Some impurity reduction, but not a silver bullet |
| | XP-1006 | 1.28 | 50R11-2 | incomplete | High-kappa Neutral Beam Heated Scenarios with Improved Control |
| | XP-1058 | 1.56 | 61 | done | PF4/PF5 shots were less stable than PF5 shots? |
| | XP-1064 | 1.59 | 62 | done | Many EPH, but couldn't hold them |
| | XP-1069 | 0.21 | 8 | done | Measure pedestal fluctuations as ELMs suppressed w/lithium |
| ITER | XP-1025 | 1.28 | 50 PEP-25 | done | Extended database of 3-D fields & jogs for ELM pacing |
| ITER | XP-1027 | 0.46 | 18 PEP-19 | done | No impurity control with sub-ELM RMPs |
| | | 11.33 | 442 | | 9 Total ASC+ASC/ITER |

| BP | XP # | Run Time | | TSG | Comments |
|----|---------|--------------|----------------------------|------|---|
| | | (days) | shots | | |
| | XP-1026 | 1.26 | 49 PEP-25 | done | 3-D fields perturbed heat flux profiles |
| | XP-1043 | 5.69 | 222 JRM 2010 | done | Finished drsep scan for divertor heat flux profiles (Bay K LITER aligned) |
| | XP-1044 | 1.51 | 59 JRM 2011 | done | Scaling of pedestal heights, looking for high pedestal |
| | XP-1045 | 3.41 | 133 R10-3, 2011 JRM, | done | Snowflakes made by starting w/fiducial (Hi triangularity) |
| | XP-1046 | 1.18 | 46 R10-3, | done | The effect of 3-D fields on divertor profiles |
| | XP-1048 | 0.74 | 29 PEP-25 2010 | done | Park, RMPs & ELMs |
| | XP-1051 | 0.49 | 19 JRM | done | Test of LLD Electrodes for SOL Control |
| | | 14.28 | 557 | | 7 Total BP |

Run Usage (LR & MS)

| LR | XP # | Run Time (days) | shots | TSG | Comments |
|----|----------|-----------------|-------|------|---|
| | XP-1000 | 4.67 | 182 | done | LLD Heated to 320°, no pumping |
| | | | R11-3 | | |
| | XP-1001 | 1.13 | 44 | done | LLD Pumping Group XP |
| | | | R11-2 | | Core impurity density and Prad reduction w/ variations in LLD |
| | XP-1002 | 1.59 | 62 | done | divertor conditions |
| | XP-1041A | 1.10 | 43 | done | Henry Kugel LLD pumping |
| | XP-1056 | 0.56 | 22 | done | Imp Reduction with Li aeorsol |
| | XP-1059 | 2.54 | 99 | done | LLD Characterization part II |
| | | 11.59 | 452 | | 6 Total LR |

| MS | XP # | Run Time (days) | shots | TSG | Comments |
|----|---------|-----------------|------------------|------|--|
| | XP-1019 | 1.08 | 42 | done | Beta feedback is successful |
| | | | R10-1, MDC-17 | | |
| | XP-1020 | 1.36 | 53 | done | good data on rotation variation and RFA done |
| | | | R10-1 MDC-2,1 | | Collected halo current data, 2-color camera data possible Li effects |
| | XP-1021 | 1.21 | 47 | done | |
| | | | MDC-15 | | |
| | XP-1023 | 2.69 | 105 | done | XP is done |
| | | | R10-1 MDC-2,1 | | |
| | XP-1032 | 0.90 | 35 | done | Error field threshold scaling in H mode - next step devices |
| | XP-1062 | 0.38 | 15 | done | NTV behavior: low collisionality and maximum variation of wE |
| | | | R10-1,3 MDC-2 | | |
| | XP-1031 | 2.44 | 95 | done | Current ramp suppression of ELMs not reproducible? want 2 hours |
| | | | PEP-25 | | LQG controller for RWM stabilization, got some good data, want more |
| | XP-1022 | 1.05 | 41 | inc. | |
| | | | R10-1 MDC-2 | | |
| | | 11.10 | 433 | | 8 Total MS+ITER |

Run Usage (SFSU, T&T and WPI)

| SFSU | XP # | Run Time (days) | shots | TSG | Comments |
|------|---------|-----------------|-------|------|--|
| | XP-1034 | 3.36 | 131 | done | 7 Caps, no abs arcs, 330 kA of CHI current |
| | | 3.36 | 131 | | 1 Total SFSU |

| T&T | XP # | Run Time (days) | shots | TSG | Comments |
|-----|-----------------|-----------------|----------|------|--|
| | XP-936 | 1.46 | 57 | done | Look for effects of rotation shear on confinement/turbulence |
| | XP-1037 | 0.79 | 31 R11-1 | done | Study of the Parametric Dependence of High-k Turbulence |
| | XP-1042 | 0.97 | 38 TC-9 | done | Use torque transients to understand rotation scaling |
| | XP-1067 | 0.59 | 23 | done | Zonal flows and blobs, no affect from BEEP |
| | XP-1028/9 22 | 0.95 | 37 R10-3 | done | Lack of LITER impacted machine performance |
| | XP-1029 | 0.69 | 27 R10-3 | done | Dependence of PLH on Radius and triangularity of the X-point |
| | XP-1041 | 1.36 | 53 R08 | inc. | Poloidal rotation joint XP |
| | | 6.82 | 309 | | 8 Total T&T + ITER |

| WPI | XP # | Run Time (days) | shots | TSG | Comments |
|-----|---------|-----------------|-------|------|---|
| | XP-1009 | 1.28 | 50 | inc. | HHFW heating at low Te, Ip |
| | XP-1011 | 1.08 | 42 | done | Acquired full BES profile of TAE |
| | XP-1013 | 0.74 | 29 | done | Good BES data on IfCAE |
| | XP-1014 | 0.67 | 26 | done | Study of Angelfish instability & effect of HHFW |
| | XP-1017 | 0.03 | 1 | inc. | Down/CA for NB/TOR (TVPS) |
| | | 3.79 | 148 | | 5 Total WPI + ITER |

Run time as allocated for FY2011

| | XP # | Run Time (days) | shots | TSG | Comments |
|----------|---------|-----------------|-------|------|---|
| ASC | XP-1006 | 0.69 | 27 | done | vertical stability at high kappa, high aspect ratio w/improved control |
| | XP-1058 | 0.56 | 22 | done | Kolemen squareness |
| | XP-1071 | 0.74 | 29 | done | Gerhardt high kappa/aspect ratio |
| | | 2.00 | 78 | | 3Total ASC |
| BP | XP-1050 | 1.03 | 40 | done | Divertor detachment Soukhanovskii |
| | | 1.03 | 40 | | 1Total BP |
| LR | XP-1000 | 1.08 | 59 | done | XP-1000. Down for COM. Missed shots on COM |
| | XP-1002 | 0.21 | 8 | done | XP-1002 Core impurity density and Prad reduction w/variations in LLD conditions |
| | | 1.72 | 67 | | 2Total LR |
| MS | XP-1022 | 0.62 | 24 | inc. | State-space controller |
| | | 0.62 | 24 | | 1Total MS |
| SFSU | XP-1034 | 2.62 | 102 | done | Late start for MSE Calibration |
| | | 2.62 | 102 | | 1Total SFSU |
| T&T | XP-1036 | 1.36 | 53 | done | Battaglia H-mode threshold with D & He |
| | XP-1037 | 0.64 | 25 | done | Ren |
| | XP-1038 | 0.51 | 20 | done | Smith multi-scale turbulence |
| | XP-1039 | 0.87 | 34 | done | Kubota Ohmic H-modes |
| | XP-1040 | 1.21 | 47 | done | Down for COM |
| | XP-1041 | 0.44 | 17 | done | Poloidal rotation joint XP |
| | XP-1042 | 0.56 | 22 | done | Solomon rotation |
| | XP-1070 | 0.49 | 19 | done | Smith turbulence anisotropy |
| | XP-1072 | 0.62 | 24 | done | Boedo plunging probe measurement of pedestal (beginning/end of day |
| | XP-1073 | 0.72 | 28 | done | Clayton imp transport |
| | XP-1074 | 0.77 | 30 | done | Diallo pedestal structure vs triangularity |
| | XP-1029 | 1.36 | 53 | done | Battaglia PLH |
| | XP-1030 | 0.46 | 18 | inc. | Battaglia off-axis ELM suppression |
| | | 10.00 | 390 | | 13Total T&T+ITER |
| WPI/ITER | XP-1015 | 0.69 | 27 | done | Fu M3D-k validation |
| | XP-1017 | 0.28 | 11 | inc. | Hosea |
| | | 0.97 | 38 | | 2Total WPI+ITER |

Summary of Run Time Allocation for the FY10 NSTX Run

| TSG | 1st priority XP run days | 1st + 2nd priority XPs | Milestones | Days used FY10 | Days used FY11 |
|---|-----------------------------|---------------------------|-------------------|-------------------|-------------------|
| Advanced Scenarios and Control | 6 | 8 | R(10-2) | 11.3 | 2.0 |
| Boundary Physics | 8 | 10 | Joint, R(10-3) | 14.3 | 1.0 |
| Lithium Research | 5.5 | 8 | | 1 1.6 | 1.7 |
| Macroscopic Stability | 6 | 8 | R(10-1) | 11.1 | 0.6 |
| Solenoid-free Start-up and Ramp-up | 4.5 | 6 | R(10-2) | 3.4 | 2.6 |
| Transport and Turbulence | 5.5 | 7 | | 6.8 | 10.0 |
| Wave-Particle Interactions | 6 | 8 | R(10-2) | 3.8 | 1.0 |
| XMPs | | | | 13 | 2.4 |
| Total | 41.5 | 55 | | 75.3 | 21.3 |