NSTX

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Advanced Scenarios and Control in 2010

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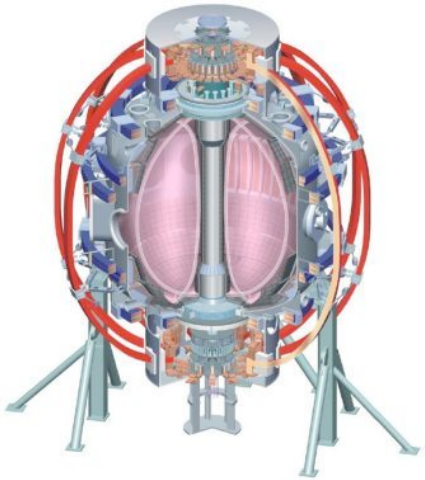
Stefan Gerhardt (ASC TSG Leader)
Michael Bell (ASC TSG Deputy)
Egemen Kolemen (Theory and Modeling)

NSTX Research Forum for 2010 Campaign
December 1st, 2009



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Overarching Priorities, Goals, and Milestones

- Long Term Priorities:
  - Attempt to achieve long-pulse density control for increased neutral beam current drive fraction using improved fueling and lithium conditioning.
  - Develop high non-inductive current fraction plasmas with high-beta and high bootstrap fraction under sustained conditions.
  - Develop and implement improved plasma control techniques to achieve advanced operating scenarios.
- Programmatic FY 2010 Goal
  - Develop/assess HHFW as a control tool in advanced scenarios:
    - Reliably increase central Te of moderate-high power NBI H-mode with HHFW
    - Assess impurity accumulation vs. HHFW power during Li ELM-free H-modes
    - Heat NBI H-mode during ramp-up to modify J profile evolution
    - Attempt on-axis HHFW CD during NBI H-mode to modify core q-shear
- FY 2011 Milestone:
  - ***Assess the dependence of integrated plasma performance on collisionality.***

ITPA/ITER Activities Relevant to the ASC Group and Run Time Allocation

- IOS Group
  - IOS-1.2: Study seeding effects on ITER demo discharges.
  - IOS-2.2: Ramp-down from q_{95}=3.
  - IOS-4.1: Access conditions for hybrid scenario.
  - IOS-4.2: ρ^* dependence of transport and stability in hybrid scenarios.
  - IOS-5.2: Maintaining ICRH coupling in expected ITER regime.
  - IOS-6.2: l_i control during current ramps.
- Other Groups
  - PEP-19: Mechanism of edge transport with RMP fields.
  - PEP-25: ELM control by midplane RMP coils
  - MDC-13: Vertical stability physics
- Direct ITER support tasks
  - ITER Work Programme, 2.1.1, 2.1.2, 2.1.3, 2.2.3

5.5 days for 1st priority and 8 days for 1st + 2nd priority

20 Proposals Requesting 21.5 Run Days

Rely on above priorities, goals, milestones, and ITPA participation for time allocations

Agenda For Wednesday Breakout Session (B252)

Time	Primary Proposer	Title	Run Time Request
1:30	Gerhardt	Review of TSG Priorities	0
1:37	Gerhardt	Stability, Transport, and Current Drive at High Normalized Current and Reduced Density	1.5
1:44	Gerhardt	Confinement, Stability, and Boundary Control During Current Rampdown in NSTX	1
1:51	Gerhardt	Early HHFW Heating for Current Profile Modifications	2
1:58	Bell	Use of HHFW heating to increase the non-inductive current fraction in NBI-produced H-mode plasmas	1.5
2:05	Yuh	Reversed shear H-modes & Sustained reversed shear L-modes	1
2:12	Menard	Tests of fast wave current drive for core q profile control	1.5
2:19	Menard	Application of early error field correction to advanced scenarios	1
2:26	Menard	Modifications to the early discharge evolution to reduce late impurity content	1.5
2:33	Kolemen	Development of Fiducial Shots with LLD: Strike Point Control Improvement and Incorporation in Regular Operation	1
2:40	Kolemen	Combined X-point height and OSP control	1
2:47	Kolemen	Implementation, Testing and Tuning of the Squareness Control with PF4	1.5
2:54	Kolemen	Squareness Impact of Outer Squareness on High-kappa Discharge Performance	1
3:01	Kolemen	Rotation Control	0
3:08	Kolemen	Snowflake Control	1
3:15	Soukhanovskii	Snowflake divertor configuration with reversed PF1B coil current	1
3:22	Raman	Development of Targets with Low Electron Density During the Current Ramp-up Phase	1
3:29	Canik	Synergistic effects between 3D fields and vertical jogs in ELM pacing	1
3:36	Canik	Combining n=3 ELM triggering with RF for edge and core impurity control	1
3:43	Canik	RMPs below the ELM triggering threshold for impurity screening	0.5
3:50	Canik	ELM pace-making with n=3 fields during ELMy H-modes	0.5
3:57	Sontag	Feasibility of achieving QH-mode in NSTX	1
4:04	Break		
4:14		Determine Prioritization	