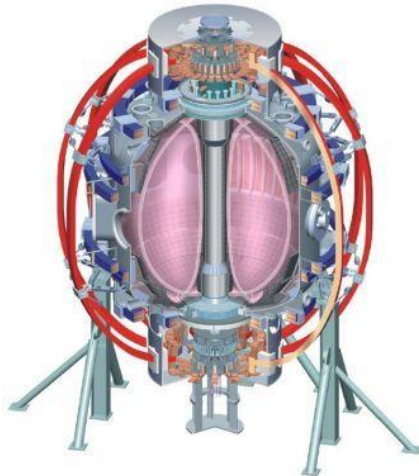


NSTX-U Program Update

J. Menard

**NSTX Physics Meeting
B318
January 23, 2012**



*Columbia U
CompX
General Atomics
FIU
INL
Johns Hopkins U
LANL
LLNL
Lodestar
MIT
Nova Photonics
New York U
ORNL
PPPL
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
NFRI
KAIST
POSTECH
ASIPP
ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
ASCR, Czech Rep*

Draft FY2012-14 NSTX-U research milestones

	FY2012	FY2013	FY2014
Expt. Run Weeks:			12
Transport and Turbulence		Perform integrated physics+optical design of new high- k_{θ} FIR system	
Macroscopic Stability	Investigate magnetic braking physics and toroidal rotation control at low v^* (with ASC TSG)		Assess access to reduced density and v^* in high-performance scenarios (with ASC, BP TSGs)
Boundary and Lithium	Project deuterium pumping using lithium coatings and cryo-pumping	Assess relationship between lithium-conditioned surface composition and plasma behavior	
Waves+Energetic Particles		Perform physics design of ECH & EBW system for plasma start-up & current drive in advanced scenarios	Develop reduced models for *AE mode-induced fast-ion transport
Solenoid-free Start-up/ramp-up	Simulate confinement, heating, and ramp-up of CHI start-up plasmas (with HHFW TSG)		
Adv. Scenarios and Control			Assess advanced control techniques for sustained high performance (with MS, BP TSGs)
ITER Needs + Cross-cutting		Identify disruption precursors and disruption mitigation & avoidance techniques for NSTX-U and ITER	
Joint Research Target (3 facility)	Understand core transport and enhance predictive capability	Stationary regimes w/o large ELMs, improve understanding of increased edge particle transport	TBD

In 2012-13 team will also formulate 5 yr plan to access broad range of new ST regimes with NSTX-U + follow-on upgrades

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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1 MA Plasma

Upgrade Outage

1.5 → 2 MA Plasma

● HHFW Upgrade

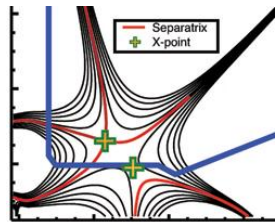
● LLD

● Moly-tile

● 2nd NBI

● CHI Control Coils

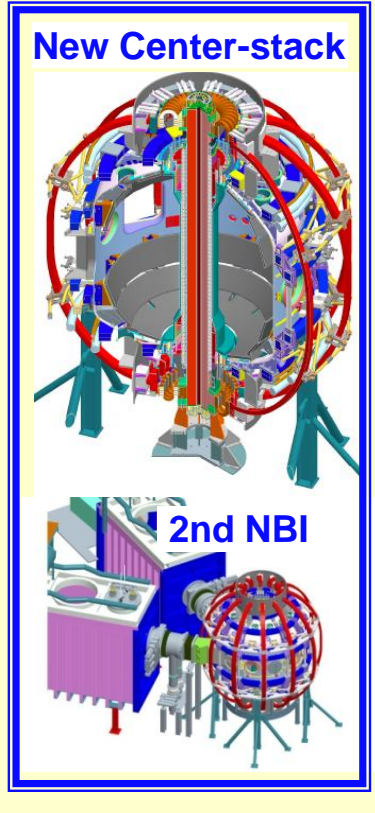
New Center-Stack ●



“Snowflake”



Lithium



● 1MW → ● 2 MW ECH/EBW

● Long-pulse Divertor

0.5 MA CHI

0.5 MA Plasma Gun

● 1 MA CHI / Plasma Gun

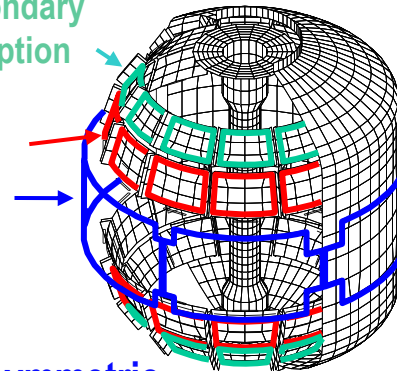
● NCC Upgrade

Secondary PP option

Primary PP option

Existing coils

Non-axisymmetric Control Coils (NCC)



NSTX Upgrade Research Goals

- Low collisionality plasma regimes
- 100% non-inductive operation
- Long-pulse, high power divertor
- Advanced high- β scenarios

Upcoming planning meetings

- Facility brainstorming
Feb 7 and 8
 - Go to nstx-u.pppl.gov

The screenshot shows the NSTX-U website with the following elements:

- Navigation:** Home, Meetings, Calendars, Drag & Drop, Phone Book, Sitemap
- Logos:** U.S. DEPARTMENT OF ENERGY Office of Science, NSTX Upgrade, PPPL PRINCETON PLASMA PHYSICS LABORATORY
- Image:** A group photo of many people in a meeting room.
- Left Sidebar:**
 - NSTX-U Web Pages:** Home, Overview, Mission, Accomplishments, Collaboration Info, Diagnostics, Five Year Plan, Operations, Organization, Program, Project, Publications, Scientific Conferences, Software, Topical Science Groups, NSTX Upgrade Project
 - Additional Links:** Logos for MIT, Princeton University, PPPL, ITER, ITPA, and USBPO.
- Main Content:**
 - Upcoming and Recent NSTX-U Meetings:**
 - [Facility Enhancement Brainstorming - February 7 and 8, 2012](#)
 - NSTX-U PAC-31 - April 17-19, 2012
 - [Collaboration opportunities on smaller facilities, PPPL, and DIII-D \(10/19/2011\)](#)
 - [Collaboration goals and expectations, opportunities on larger facilities \(9/20/2011\)](#)
 - [2nd International Symposium on Lithium Applications \(5/27-29/2011\)](#)
 - Quick Links for Additional Information:**
 - [Run Schedule](#)
 - [Experimental Proposals](#)
 - [Monday Physics Meetings](#)
 - [Scientific Conferences](#)
 - [Annual Research Forum](#)
 - [NSTX-Upgrade Five Year Plan](#)
 - [Information for Collaborators](#)
- Footer:** Please post any comments or recommendations for this website [here](#)

- Will have theory and modeling needs brainstorming meeting after that