NSTX Research Forum and Suggested PPPL Preparation

Martin Peng
ORNL@PPPL

NSTX Physics Meeting
MBG Auditorium, PPPL
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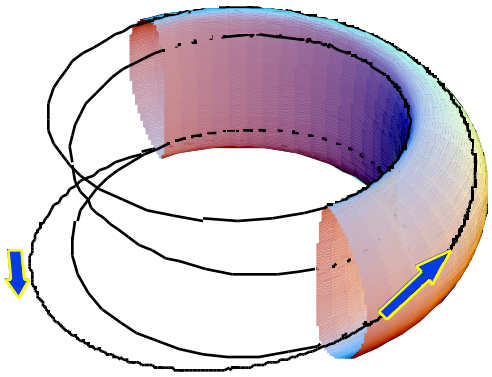
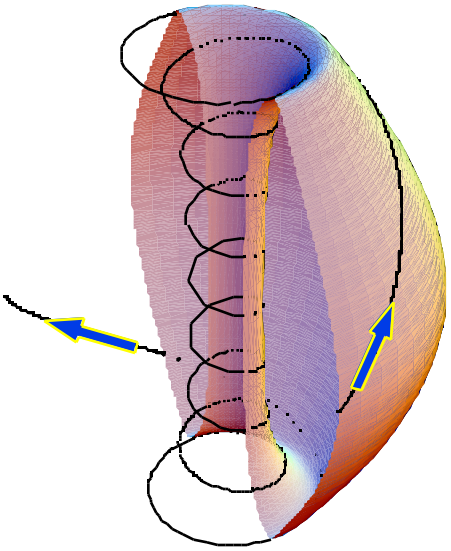
Opportunities for Discovery, Innovation and Advancement are Indicated for ST Plasmas

- Noninductively formed ST plasmas → minimum magnetic flux and helicity per plasma current (HIT, SPHEX, TST; CDX-U, DIII-D)
- Efficient heating and current sustainment → new regime for RF and NBI (CDX-U; HIT-II, SPHEX; START)
- High stable average β_t (25 − 45%) with aligned pressure gradient driven current fraction (50 − 90%) (PPPL, UKAEA Fusion, GA)
- High confinement (with high β) → strong magnetic well, shear, and curvature (TFTR, DIII-D: ERS, H-mode)
- Thick outboard SOL and divertor channel → strong mirror ratio and curvature (START)

Spherical Torus Offers for Plasma and Fusion Sciences a Unique Innovative Physics Regime for Investigation



Tokamak Plasma and Magnetic Field Line (safety factor q = 4.0)

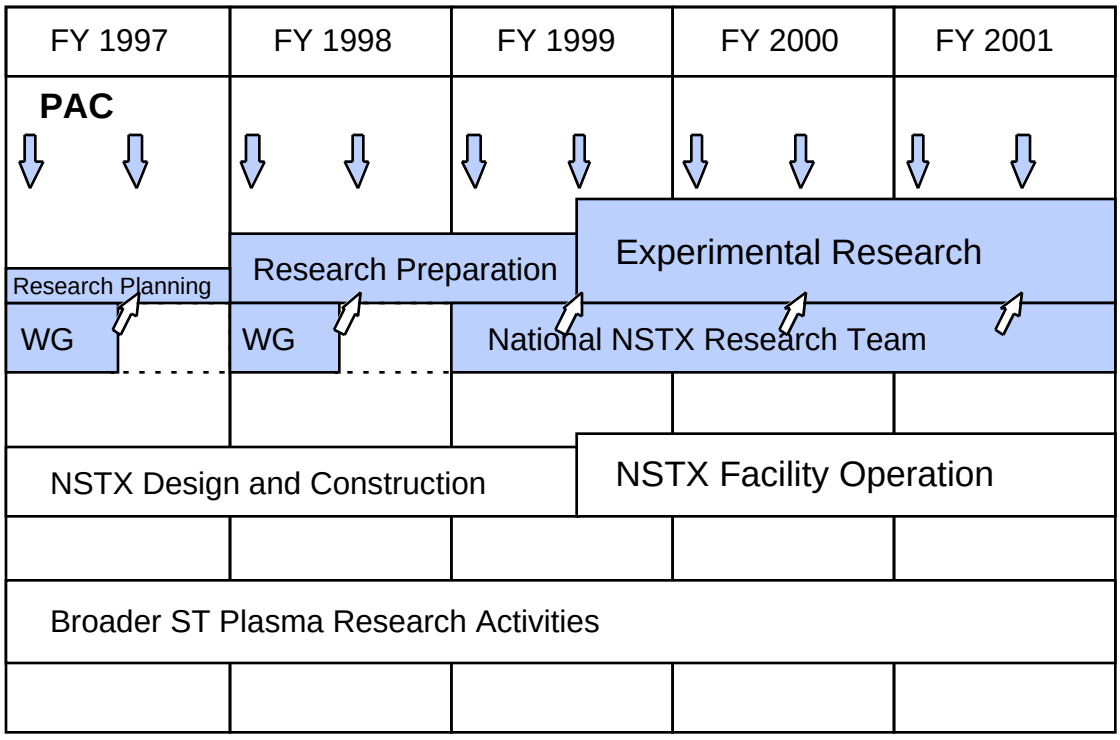


Spherical Torus Plasma and Magnetic Field Line (safety factor q = 9.6)

A Vision for the Capital N in NSTX

- A National NSTX Research Team utilizing the NSTX facility
- The NSTX facility provides strong support for the on-site needs of the researchers
- An open process for establishing the scientific elements of the research program
- Contribute to the Innovative Confinement Concepts Task Force

NSTX Research Program Development Schedule



Purpose of NSTX Research Forum (2/5 7/97)

- Provide an efficient opportunity to
  - Outreach to the broad expertise of the U.S. magnetic fusion community for input
  - Develop the scientific elements of

  the National NSTX Research Program

NSTX Working Groups are the Centerpiece of the NSTX Research Forum

The Working Groups, guided by the NSTX scientific mission and goals, have graciously agreed to serve.

- Receive inputs and organize open WG Sessions during the Forum
- Hold the WG Sessions for all contributors
- Present summary of the WG Session results
- Produce WG reports on the scientific elements of NSTX research

Researchers Interested in Participating in NSTX Research are Encouraged to Send Inputs to WGs

Send one-page synopsis to all Coordinators, Assistant and Members of WGs of appropriate topics, containing

- Scientific issue(s) being addressed
- Relevance to ST Fusion and/or Plasma Science, identifying uniqueness to ST plasmas
- Measurements needed and/or recommended
- Plasma parameters and operating conditions required

WG1: ST and Compact Torus Plasma Formation

Tom Jarboe (Univ. Washington), C,	jarboe@aa.washington.edu
Masaaki Yamada (PPPL), A,	myamada@pppl.gov
Jan Hugill (UMIST),	
John Sarff (U. Wisc.),	sarff@juno.physics.wisc.edu
Ravi Sudan (Cornell U.),	sudan@lps.cornell.edu
Bick Hooper (LLNL),	Bick.Hooper@binhex.llnl.gov
Paul Bellan (Cal. Tech.),	pbellan@cco.caltech.edu
Alan Hoffman (U. Wash.),	Hoffman@aa.washington.edu
Sam Cohen (PPPL),	scohen@pppl.gov
King-Lap Wong (PPPL),	kwong@pppl.gov
Hantao Ji (PPPL),	hji@pppl.gov

WG2: Heating and Current Initiation and Sustainment

Don Batchelor (ORNL), C,	batchelordb@ornl.gov
Dick Majeski (PPPL), A,	rmajeski@pppl.gov
Tim Bigelow (ORNL),	bigelowts@ornl.gov
Cary Forrest (TBD),	forest@gav.gat.com
Tom Intrator (Univ. Wisc.),	intrator@engr.wisc.edu
Larry Grisham (PPPL),	lgrisham@pppl.gov
Dan D'Ippolito (Lodestar),	dasd@lodestar.com
TK Mau (UCSD),	mau@fusion.ucsd.edu
TBD (GA)	
TBD (MIT)	

WG3: Magnetics and Stability Limits

Eric Fredrickson (PPPL), C,	efredrickson@pppl.gov
Steve Sabbagh (Columbia U.), A,	ssabbagh@pppl.gov
Pribyl (UCLA),	pribyl@ucla.edu
Ed Lazarus (ORNL),	Lazarus@gav.gat.com
Neil Pomphrey (PPPL),	npomphrey@pppl.gov
Chris Hegna (U. Wisc.),	hegna@cptca.neep.wisc.edu
Mike Hughes (Grumman),	hughes@grump.com
Jesus Ramos (MIT),	ramos@pfc.mit.edu
TBD (GA)	

WG4: Transport and Fluctuations

Ed Synakowski (PPPL), C,	esynakowski@pppl.gov
Ray Fonck (U. Wisc.), A,	fonck@engr.wisc.edu
Ernesto Mazzucato (PPPL),	emazzucato@pppl.gov
Bill Dorland (UT-Austin),	bdorland@zonker.ph.utexas.edu
Greg Rewoldt (PPPL),	grewoldt@pppl.gov
Tony Peebles (UCLA),	peebles@gav.gat.com
David Newman (ORNL),	newmande@ornl.gov
TBD (GA)	
TBD (MIT)	

WG5: Divertor, Scrape-Off Layer, and Fueling

Peter Mioduszewski (ORNL), C,	mioduszewspk@ornl.gov
Stewart Zweben (PPPL), A,	szweben@pppl.gov
Charles Skinner (PPPL),	cskinner@pppl.gov
Stan Milora (ORNL),	milorasl@ornl.gov
David Hwang (UC Davis),	hwang1@llnl.gov
Dave Hill (LLNL),	HillD@gav.gat.com
Stan Luckhardt (UCSD),	sluckhardt@ucsd.edu
TBD (GA)	
TBD (MIT)	

NSTX Research Forum Format

- Plenary session (half day) for scientific mission and goals, NSTX facility capabilities, NSTX physics considerations
- Parallel WG sessions (3 half days) to present, discuss, improve and integrate inputs on NSTX research and diagnostics
- Plenary session (half day) to present WG results
- Tour of NSTX facilities

Schedule

- Mid-December: distribute NSTX information on web
- January 20: receive inputs (synopsis)
- January 27: organize and distribute WG session agendas
- February 5-7: NSTX Research Forum
- Mid-February: issue WG reports