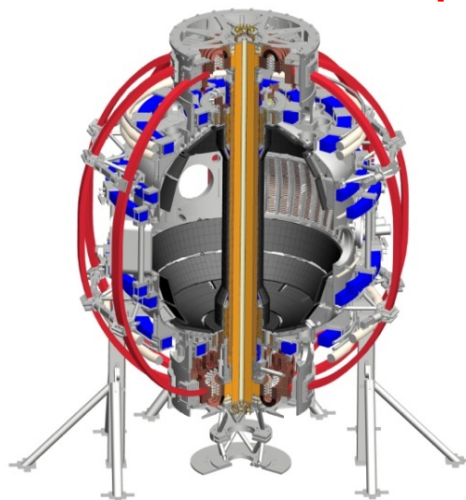


# NSTX-U 5-Year Plan Chapter 7 Status

**Gary Taylor**

*for the NSTX-U Wave Heating and Current Drive Group*

**NSTX-U Physics Meeting  
PPPL B318  
September 17, 2012**



Coll of Wm & Mary  
Columbia U  
CompX  
General Atomics  
FIU  
INL  
Johns Hopkins U  
LANL  
LLNL  
Lodestar  
MIT  
Lehigh U  
Nova Photonics  
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 Tennessee  
U Tulsa  
U Washington  
U Wisconsin  
X Science LLC

Culham Sci Ctr  
York U  
Chubu U  
Fukui U  
Hiroshima U  
Hyogo U  
Kyoto U  
Kyushu U  
Kyushu Tokai U  
NIFS  
Niigata U  
U Tokyo  
JAEA  
Inst for Nucl Res, Kiev  
Ioffe Inst  
TRINITI  
Chonbuk Natl U  
NFRI  
KAIST  
POSTECH  
Seoul Natl U  
ASIPP  
CIEMAT  
FOM Inst DIFFER  
ENEA, Frascati  
CEA, Cadarache  
IPP, Jülich  
IPP, Garching  
ASCR, Czech Rep

# Progress Writing Chapter 7

- Introduction (Taylor: 8/30/12)
- 7.1 Overview of Goals and Plans:
  - 7.1.1 Research Thrusts (Taylor: 9/14/12)
  - 7.1.2 Research Needed to Enable Thrusts (Taylor: 9/18/12)
- 7.2 Research Plans:
  - 7.2.1 HHFW Research Supporting Thrusts (Hosea & Taylor: Requested 9/30/12)
  - 7.2.2 Thrust 1 RF Non-inductive Plasmas (Taylor: 10/8/12)
  - 7.2.3 Thrust 2 HHFW Core CD (Hosea: requested 9/30/12)
  - 7.2.4 Validation of RF codes (Taylor & Phillips: 10/8/12)
- 7.3 Tools Needed to Achieve Goals:
  - 7.3.1 Theory & Simulation (Phillips: requested 9/30/12)
  - 7.2.2 Diagnostics (Hosea, Podesta & Taylor: 10/8/12)
  - 7.3.3 Other Facility Capabilities (Hosea & Taylor: 10/8/12)
- I am on vacation September 19-30, so most of my remaining contribution to chapter writing, and integration of co-author contributions, will occur during October

## Data Analysis & Simulation Tasks

- HHFW and EBW heating and current drive has been modeled for Stefan's NSTX-U plasma 142301V11 ( $B_T(0)=1$  T,  $I_p = 1.1$  MA,  $P_{nbi} = 6.3$  MW, 6 cm outer gap for HHFW coupling) with GENRAY and CQL3D:
  - Need to model other candidate NSTX-U discharges at lower  $B_T(0)$  and for a range of  $I_p$
  - Need GENRAY, TORIC, and AORSA simulations of NSTX-U discharges with SOL model
- Modeled ECH for NSTX CHI start-up discharge 140872 at 22 ms:
  - Need to simulate ECH and HHFW for NSTX-U CHI non-inductive start-up and ramp-up
  - Work is progressing on TSC modeling NSTX-U non-inductive start-up and ramp-up, but still need to couple to TRANSP – this will probably happen in December