



U.S. DEPARTMENT OF
ENERGY

Office of
Science



EP-TSG meeting

02/14/2017

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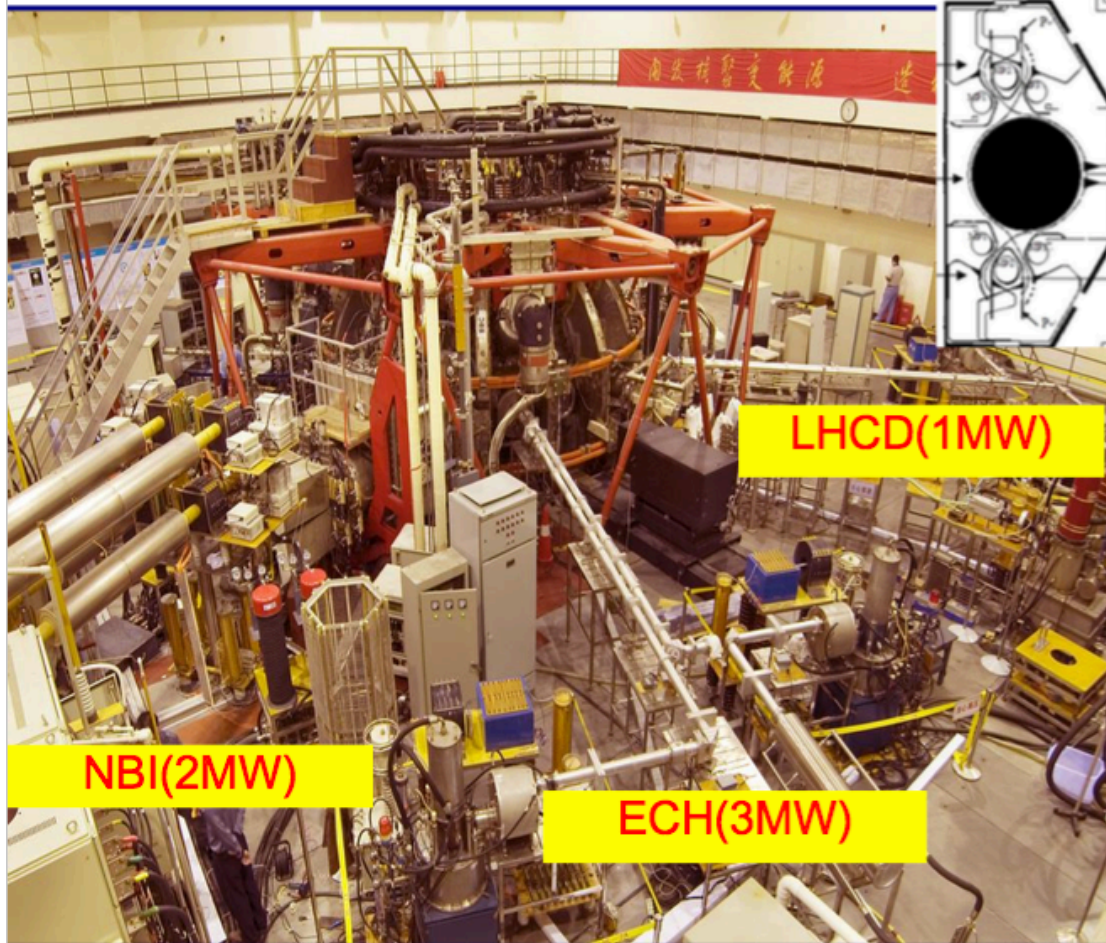
Agenda:

- Update: TTF, NSTX-U FY17-18 Milestones, 5y plan
- Discuss collaborations with HL-2A (SWIP – Chengdu, China)

HL-2A has offered run time to NSTX-U Team

- Next Run period: March-June 2017 (planned)
- “Run time guaranteed for NSTX-U Team”
- Experimental proposals:
 - Coordinate at TSG level (this meeting)
 - Discuss/coordinate at SG level
 - Coordinate with HL-2A Task Force leaders
 - Review by HL-2A Team

HL-2A capabilities



- HL-2A tokamak:
 - $R/a=1.65\text{m}/0.4\text{m}$
 - $I_p=150\text{-}300\text{kA}$, $B_T=1.3\text{-}2\text{T}$
 - $n_e=1\text{-}4e19\text{ m}^{-3}$, $T_e=1\text{-}3\text{ keV}$

- Heating and fuelling
 - ECRH: 2-3MW (coupled power), 500Hz modulation, 68GHz
 - NBI: 1-2MW, 40keV
 - LHCD: 1MW, 3.7GHz
 - Pellet: repetitive
 - SMBI: 0.2-3MPa, 100Hz modulation
 - RMP ($n=1$)
- More than 30 diagnostics have been developed

see extended summary in today's meeting folder:

http://nstx.pppl.gov/DragNDrop/Science_Groups/core/TSGs/energetic_particles/2017/meeting_02142017/

HL-2A diagnostics /1



Diagnostics for energetic particle physics study

•Heating: ECRH (3MW/1s), NBI(2MW/1s), LHCD(1MW)

•ECRH modulation: 500Hz

■ Fast ion spectrum and distribution

- CXRS (32ch)
- Imaging-FIDA (2017)

■ Fast electron spectrum and distribution

- Multi-channel CdTe array (9-ch)
- Soft-X-ray spectrum (SDD)
- ECE (50-110G, 110-170G, 2ms)

■ Fast particle loss

- gama-ray spectrum(NaI, HPGe)
- Fission chamber (2-ch)
- ³He Neutron spectrum
- Neutron camera (9-ch, 2015)

■ Wave-particle interaction

- Mirnov probe (18ch+10ch)
- Reflectometer (2ch)
- Interferometer (4ch)
- Doppler (>20ch)
- ECE/ECEI (32ch, 384ch)
- Soft-X-ray array (100ch)
- BES (2017)

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HL-2A diagnostics /2



Newly developed diagnostics

Diagnostics	parameters	
CO2 interferometer	Line-averaged density, 1ch, 1us (for density feedback)	2016
BES	Density fluctuation, based on NBI	2017
CTS	High K turbulence, ETG	2017
Scintillator fiber array	Fast ion loss, 20keV-200keV, 12ch (working on calibration issue)	2016
imaging-FIDA	Fast ions, 10ms, (need to improve signal)	2016
PCI	Density fluctuation	2017
Wide zoom IR camera	Whole vacuum chamber	2016
He-GPI	2D density fluctuation	2017
CIS	Impurity(Carbon) rotation (CIII, SOL, divertor, high spatial resolution)	2017

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