

XMP: FIDA/SSNPA/sFLIP Checkout

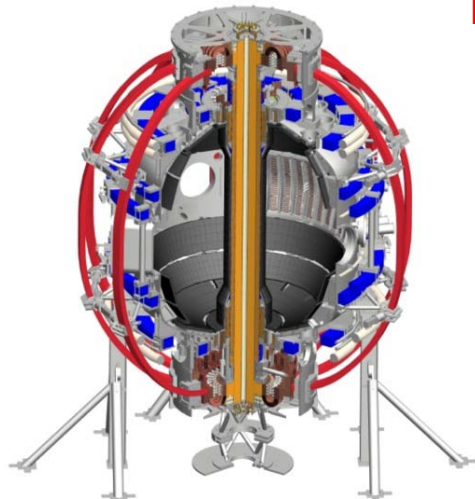
XP 1: Beam-Ion Confinement of the 2nd NBI

XP 2: Effects of 3D Fields on Fast Ion Transport

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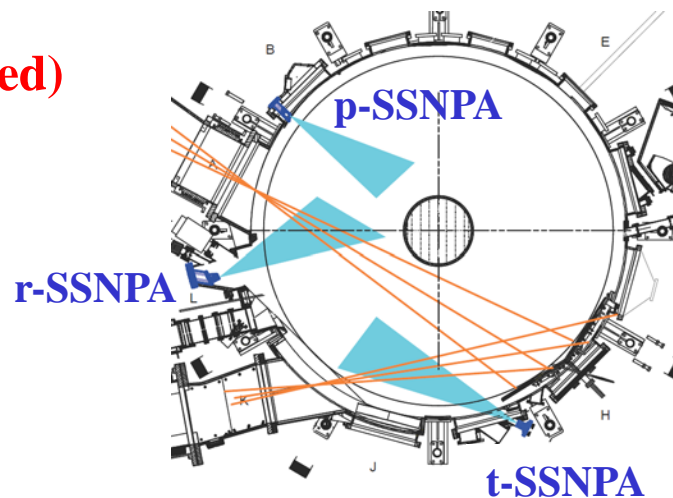
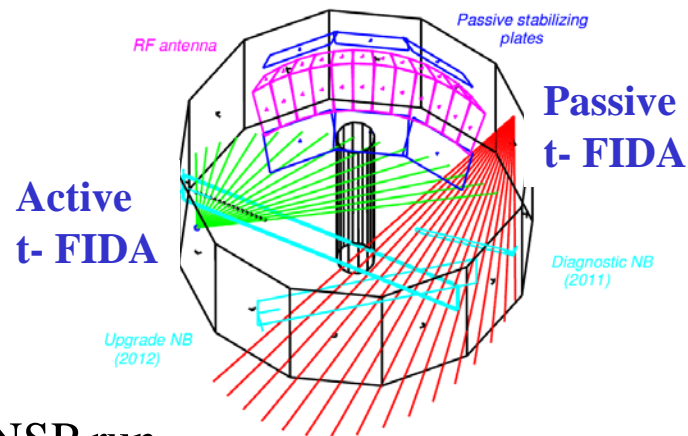


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XMP: FIDA/SSNPA/sFLIP Checkout

- Goal: check and optimize the operation of FIDA, SSNPA, sFLIP diagnostics
(important diagnostics for R(15-2) and JRT-15)
- Tasks: (1) background/passive signal
(2) scan of f-FIDA bandpass filter angle
(3) scan of I_p for sFLIP
(4) diagnostic phase space response
(5) relative NB source contribution
(6) isolated beam blips in quiescent plasma for TRANSP run
- Requested run time: **1 day (two half days preferred)**
- Prerequisites:
 - Need many beam modulation patterns.
 - Require relatively low levels of impurities for FIDA measurements
 - Need MPTS, CHERS, MSE, and magnetics.

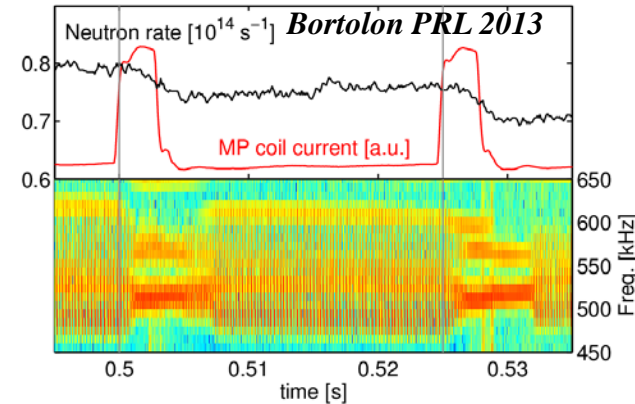


XP 1: Beam-ion Confinement of the 2nd NBI

- Goal: **to verify consistency between experiments & NUBEAM in quiescent plasmas** (where classical fast ion (FI) physics is expected) with on- and off-axis NBI.
 - Compare **neutron rise/decay rate** from beam blips with NUBEAM modeling
 - Compare FIDA/SSNPA measured **FI distribution** with NUBEAM modeling
 - Compare **prompt losses** (from sFLIP) with NUBEAM modeling through **I_p scan**
 - If time permits, perform **B_t can**
- ➔ Provide the basis for the measurements and modeling of FI distribution, NB current drive, q profile, etc. **Contribute to R(15-2) and JRT-15**
- Requested run time: **1.5 days, 1 day (two half days) minimum**
- Prerequisites:
 - **Many beam modulation patterns. Half shots with 65kV, others with 90kV.**
 - Require relatively **low levels of impurities** for FIDA measurements.
 - Prefer at least one week after FIDA/SSNPA/sFLIP checkout XMP.

XP 2: Effects of 3D Fields on Fast-ion Confinement and Fast-ion Driven Instabilities

- Goal: (1) measure FI distribution & losses in the presence of 3D fields;
(2) investigate how 3D fields affect FI distribution and instabilities.
 - MP fields alter the dynamics of bursting GAEs
 - MP fields cause FI loss/redistribution
- Need FIDA friendly discharges for FI measurements
- Requested Run time: **1 day, 0.5 day minimum**
 - may get useful data in piggyback if plasma conditions are suitable for FI diagnostics.
- Prerequisites:
 - Require relatively **low levels of impurities, medium n_e , MHD/ELM-free plasmas**
 - Need **RWM coils** to generate static perturbations.
 - Diagnostics: midplane IR camera, BES, reflectometry, and FI diagnostics
 - Codes: M3D-C1, SPIRAL/ORBIT



Backup Slides

FIDA and ssNPA Provide Valuable Measurement of Fast Ion Distribution in Real Space and Phase Space

- **Tangential and vertical FIDA** systems
 - Resolution: 16 ch, 5cm, 10ms, 10keV
 - **V-FIDA: trapped** particles (large v_{perb})
 - **T-FIDA (new): co-going passing** particles
- **SSNPA** system (new)
 - Resolution: 15ch, 5cm, ~100kHz bandwidth, three energy bands [>25 , >45 , >65] keV
 - **Radial-ssNPA: trapped** particle in the core
 - **Tangential-ssNPA: co-going passing** particles in the mid-radius plasma
 - **Passive-ssNPA: passive** signal from the edge

