

# NSTX Boundary Physics Operations July 2003



NSTX

- **Lithium Pellet Injector**
  - Chamber & flanges completed; other machining in progress.
  - Pneumatic controls box installed; integration in progress.
  - Computer tray & cabling started; completion this week.
- **Supersonic Gas Injector**
  - 2 styles of graphite Mach 8, Laval nozzles received.
  - Testing will begin after LPI completed.
- **Neutral Pressure Gauges**
  - Installation of the Bay-L and Bay-C midplane neutral pressure Micro Ion Gauges (MIG) completed.
- **Quartz Micro Balance**
  - Surface measurements (Evans East) and IBA measurements of the same samples at Sandia (W.R.Wampler) found the measured areal densities to be in agreement to within +/- 10%.
- **Advanced Boronization**
  - Proposal for Short Boronization endorsed by Activities Certification Committee (ACC), pending field review prior to making a formal recommendation to the PPPL ES&H Executive Safety Board.
- **Fast Probe Position Calibration**
  - Faro Arm measurements completed & awaiting UCSD analysis. (J.Boedo)
- **Modelling**
  - Update on the status of the edge transport modeling effort at NSTX issued; newly released data and documents placed in UNIX NSTX UEDGE directories ([taurus.pppl.gov](http://taurus.pppl.gov), [/p/nstxusr2/user/uedgedata](http://p/nstxusr2/user/uedgedata) ). (V. Soukhanovskii)

## NSTX Diagnostic Operations Plans and Issues

**July 2003**

- Diagnostic operations activities since May 20, 2003 continued to focus on in-vessel calibrations and repairs

### 1) Completion of high precision (“FARO measurement arm”) spatial calibrations

- Spatial measurements of re-entrant ultrasoft X-ray (USXR) array
- Passive stabilizer plate measurements related to positioning of resistive wall mode coils
- Calibration of tangential bolometer sightlines in new Bay G location
- Calibration of edge rotation diagnostic with new mirror
- Position measurements of the magnetic sensors (including B(z) pickup coils that were repaired and reinstalled) on passive plates
- Calibration of Frascati pinhole imaging camera X-ray system (PICXS) sightlines
- Spatial calibration of 1-D CCD camera

### 2) Completion of “white plate” detector response calibrations

- 1-D CCD camera
- Charge- exchange recombination spectroscopy (CHERS)
- Edge poloidal rotation diagnostic (EPRD)

### 3) Magnetics improvements

- Upper and lower divertor flux loops repaired and terminated
- High-frequency Mirnov coil at Bay L relocated and new one added to improve spatial distribution of sensors for MHD studies
- High-frequency Mirnov coils tested with radiofrequency generator and test coil and repaired as necessary

### 4) Access improvements

- Heating/cooling lines modified to improve diagnostic access for bottom ports in Bays B, G, and J
- Twenty-six channel fiber-optic bundle installed as part of edge impurity emission spectroscopy system (EIES) to relay visible light from NSTX Test Cell to photo-multiplier tube detectors and visible spectrometer (VIPS-2) in diagnostics prep room

### 5) Diagnostic testing

- X-ray crystal spectrometer moved to MIT for testing new detector and obtaining plasma data on Alcator C-Mod while NSTX is not operating

- Issues and Plans:

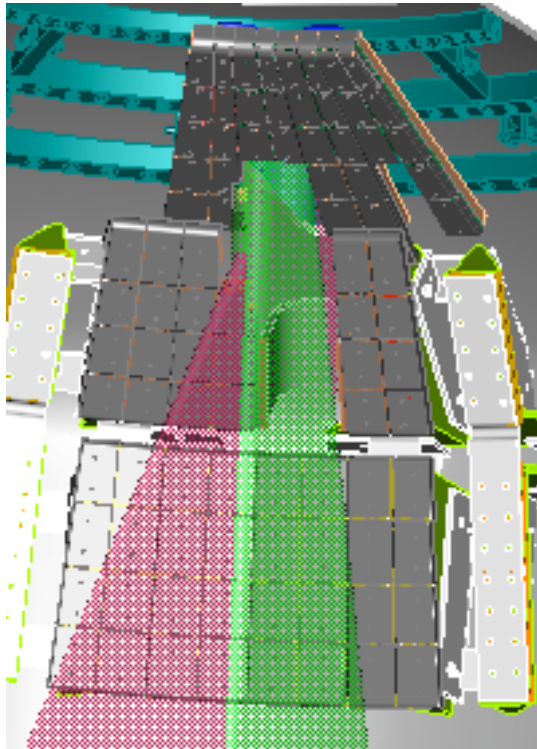
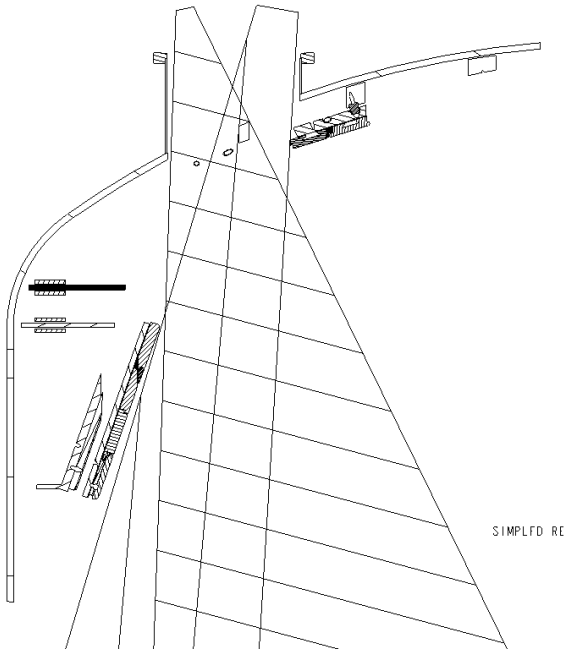
- \* Offline measurements of new supersonic gas injector nozzle performance will commence after July completion of lithium pellet injector milestone

- \* Detailed plans for using tangential X-ray imaging (PICXS) data as equilibrium constraint for NSTX plasmas being developed

- Accurate spatial calibration performed with new three-axis positioning mechanism
    - FY02 data problematic for constraining equilibria because of uncertainties in PICXS viewing geometry but are still useful for developing and evaluating reconstruction techniques

- \* “Diagnostic shakedown” session will be scheduled after more people return to PPPL

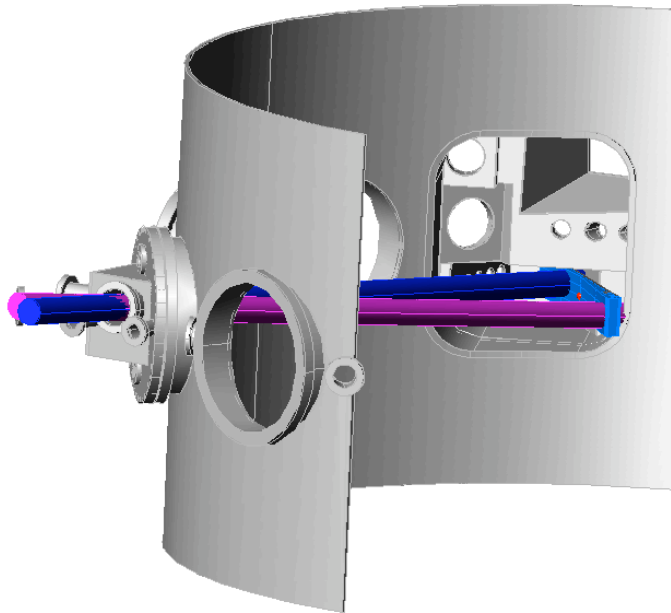
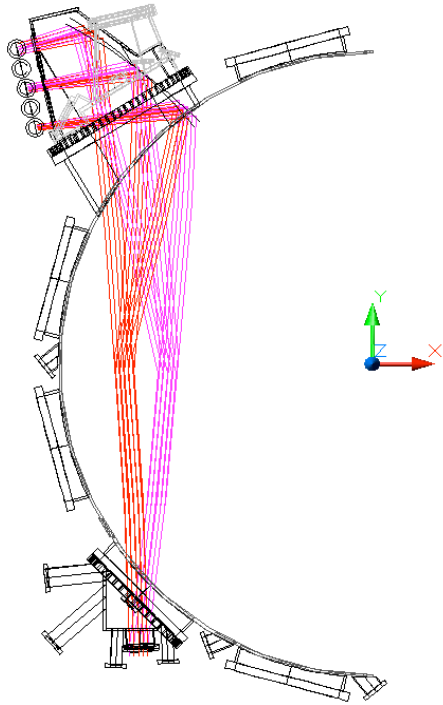
- Communication problem for CHERS computers solved but other difficulties resulting from recent control room work may remain



# NSTX poloidal CHERS

- Installation planned for fall 2004
- Will feature top and bottom views of neutral beam
- Requires viewing slots in outer divertor and secondary PP
- U-shaped copper bypass will replace copper removed from PP
- Relative to TFTR, because of lower  $T_i$  and  $B_T$  on NSTX, gyro-orbit corrections to  $v_{\perp}$  will be smaller.
- CDR (R. Feder) for in-vessel mods 7/29/03

# NSTX high-k scattering



- Aim to install vessel mods in fall 2004
- CDR held end of April, PDR for vessel mods planned for 10/03
- Currently detailing extensive modifications to Bay K
- Will also involve modifications to Bay H and to neutral beam armor
- Lab work has begun on optics mockup.
- Large mirror on order.