Research Operations Division
Boundary Physics *(H. Kugel)*

- Continuing to rely heavily on the LITER system
  - About 250g of lithium already deposited in vessel
  - Liquid-lithium filling system (LIFTER) used routinely on all 4 LITERs
  - Repairing Bay K shutter damaged by control malfunction on Monday
    - Requires two brief argon vents of vacuum vessel
    - Successfully recovered after repair of Bay-K TIV and shutter in April
  - LITER-K2 was also damaged in collision
  - Need four LITERs operational for planned round-the-clock filling of LLD

Research Operations Division
Boundary Physics *[2]*

- Preparations for second round of LLD experiments are in progress
  - XP-1059: "LLD Characterization, Part II"
  - 3 LLD plates heated to 220°C to obtain RGA spectra of outgassing after first pair of argon vents
  - Prototype gas heating system heated 4th LLD plate to 173°C average temperature (Li M.P. 180°C)
- First light seen with divertor imaging spectrometer (DIMS)
  - IR cameras, including 2-color system, taking data
- Dennis Mansfield participated in experiments on EAST using a lithium powder dropper provided by NSTX
- Performing RGA measurements in test chamber with lithium coating on various PFC surfaces
  - Porous Mo (LLD) sample completed, now setting up for graphite

Research Operations Division
Diagnostics *(R. Kaita, B. Stratton)*

- Beam emission spectroscopy diagnostic (U. Wisc) produced initial data on R = 1.4 m view
  - Performed XMP-70 to characterize signals and point-spread *vs* q(R)
  - Working to make shutter reliable for R = 1.3 m view
- Divertor fast visible cameras for full imaging of LLD operating routinely
- Reliable remote control of mirrors & attenuators for high-k scattering
- Implemented 3 MHz bandwidth electronics for FIReTIP for more reliable density data and improved fluctuation measurement capability
  - achieved ~9 dB reduction in phase noise
- NSTX research presented in invited talk and twenty-one contributed posters in 18th Topical Conference on High-Temperature Plasma Diagnostics Conference at Wildwood, NJ on May 16-21, 2010

Research Operations Division
Diagnostics *[2]*

- MSE-LIF
  - Procurements and fabrication of components making good progress
  - Installation during next shutdown
- MPTS additional channels
  - All procurements underway: many components now delivered
  - Assembling new polychromators and fabricating electronics
  - Installation during next shutdown
- Other diagnostic installations planned for next shutdown
  - Tangential FIDA (UC-Irvine) – defined new tangentially viewing ports
  - Edge soft x-ray array (JHU)
  - Real-time velocity measurement - rtCHERS (PPPL)

Research Operations Division
RF systems *(J. Hosea)*

- After plasma conditioning, launched 2.2 MW into He plasma for 200 ms
- Also reached 2.2 MW in D NBI H-mode plasma for 160 ms (after 1 arc)
- Good heating in low 300 kA discharges for startup experiments
  - $T_e(0) \sim 3$ keV with 1.4 MW at $n_e \sim 1 \times 10^{19} m^{-3}$
  - Achieved H-mode with RF only as desired for current ramp-up
- RF antenna operation has deteriorated since return to operation in June
  - Prior to first argon vent, readily vacuum conditioned to ~25 kV
  - After the vent, achieved ~20 kV only with some difficulty
  - After plasmas, could only reach ~15 kV after considerable effort
  - Cause of deterioration unknown
- Plan to perform extensive conditioning to regain ~25 kV vacuum standoff

Research Operations Division
Physics Operations *(D. Mueller)*

- 3 new Physics Operators now assisting in experiments
- Recovered operation remarkably quickly after argon vent in April
- Several enhancements to PCS tested and commissioned
  - "Relay" control (XMP-69)
  - Combined X-point height and outer strike point control (XP-1003)
  - Combined PF4/PF5 operation (XMP-68) for outer squareness control
  - Discussions underway on implementing rotation control in 2011
- Continue to suffer adverse consequences from transient events in some discharges
  - Gas system component, diagnostic electronic failures, remote control malfunctions
  - Need vigilance in maintaining integrity of ground system within and between ground categories

Research Operations Division
Safety Considerations

- Division covers many activities with potential hazards
  - Much diagnostic equipment is located in potentially hazardous areas
  - We rely on dedicated safety systems and **well established procedures** to mitigate the "external" hazards
    - high voltage, radiation, high temperatures and pressures, RF power
- What about the safety of equipment that you develop and maintain?
  - You may be the person most knowlegeable about unique equipment *but*
  - ***That can lead to complacency and situation blindness***
  - If you're fixing it, it may be because it's malfunctioning in a way that makes it hazardous
  - Do you know that the circuit you are working on or the gas line you're about to disconnect is in a safe condition?
- If you make a temporary modification to trouble shoot a piece of equipment, consider the ramifications

Research Operations Division
Safety Considerations *[2]*

- We host many visitors, some experienced, some less so
  - Hazards may seem obvious to you, but they may not be to people from other places and working environments and with less experience
  - If you are hosting a visitor, establish whom they should go to with any questions if you're not around
- Don't be reticent to ask for a second opinion about any potentially hazardous setup or to refer such questions to an experienced person
  - It's **not** a sign that you don't have "the right stuff"
- All the safety training you and our visitors take will be for nought if you don't apply it in practice to the situations you encounter
  - Ask yourself:
    - *What could go wrong?*
    - *What could this action affect?*
    - *Is this bypassing a safety related system?*