

## Session VII summary

- Russ Doerner (for George Tynan): PMI & PFC R&D in an FNS program
  - Key questions: lifetime of evolved PFCs, effects on plasma, engineering of solid materials for acceptable lifetime
  - Key program elements:
    - Understanding of SOL transport, flows, material transport
    - D/H retention, migration, microstructure effects in damaged materials
    - Thermal, mech. performance of radiation damaged high heat flux components
    - Integrated PFC performance
  - Key capabilities required:
    - Improved modeling (materials, plasma)
    - High heat flux simulators, with activated materials handling
    - Ion beam, neutron irradiation facilities
    - Focused tokamak experiments
- Rick Goulding: Plasma source development for ORNL test stand
  - Helicon source, mid  $10^{19}$  (He – lower for D), 0.5T, so far short pulse
  - Slow wave (magnetic beach) heating planned, but already demonstrated
  - Adding EBW, whistler – focusing on novel electron heating approaches
    - 0.9T, mid  $10^{17}$ , 6-8 eV so far. Code development in progress.
    - Part of next-phase LDRD effort for FY12

## Session VII summary continued

- Rob Goldston: Draft Mission & Specs for a PMI/PFC test facility (LM emphasis)
  - Test both fast flowing and capillary porous PFCs, including evaporative+ radiative effects
  - Design: 1T quarter torus + vert field, mid  $10^{19}$ , 50-100 eV, 400 MW/m<sup>2</sup> parallel heat flux
  - Possible plasma source: GDT with target just outboard of mirror throat
- Discussion:
  - Gas handling in GDT, extension beyond 5 ms, beams? – yes, wet area – 25 cm<sup>2</sup>
  - Comments on coordination of a test stand program
    - Peng: coordinate existing facilities, but not “competitive development of inventions”
    - Brooks: begin with a PFC special topics call
  - Small vs. large
    - Nygren: emphasized utility of dedicated test stands for specific projects
      - E.g. testing for C-mod hot W divertor project
    - Hillis/Goulding: present ORNL development falls into “small” category
      - Late thought: what will capability be at end of next LDRD phase?
  - Tests in tokamaks
    - Wong: GA actively considering new DiMES surface station (heated, ~100 cm<sup>2</sup>)