DMR Response: Report of the MPSAC Subcommittee on Materials Instrumentation

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Committee

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Dave Tirrell, Caltech
Peter Voorhees, Northwestern University
Recommendations

Major facilities

1. DMR should only fund the construction and operation of unique large facilities
   • DMR agrees.

2. Endorsed the recommendation of the National Academy report that the NSF should continue to provide support for the operations of the NHMFL and the development of the next generation of high-field magnets
   • DMR agrees – continuing to support the NHMFL and magnet development
CHESS Upgrade

• NSF should require CHESS to develop and submit a detailed case for the unique science opportunities that the upgrade will enable... ...A compelling case for the uniqueness of the CHESS upgrade will be a critical factor in the ultimate decision on whether to proceed or not.

• DMR agrees that CHESS must make a case for the unique science that CHESS enables and have communicated this to them.
From talk by Charles Ahn - needs for Hard Materials

US Nobel prizes in hard materials - Other than theory they come from Bell or IBM labs
Science Challenges

- **Materials synthesis and discovery** - primary bottleneck in advancing the frontier.
  - US currently behind in synthesis of hard materials.
  - Points to needs in synthesis of soft and bio-inspired materials with targeted functionality

- **Opportunity to dramatically accelerate the pace of scientific discovery and innovation**: tightly closing the loop
  - Closing the loop goes beyond communication- incorporate characterization tools into synthesis in situ
  - Combine high speed data collection with high speed computation
Response

• Endorse the concept of Closing the Loop
  – Consistent with DMREF program and MGI
  – Agree with needs and challenges that have been identified

• Requested $8M in FY 15 Budget Request to Congress for Materials Innovation Platforms
  – Midscale user facilities that incorporate research done in a Closing the Loop manner
Specifics for MIPS

- Panel states this should not be done at expense of IIA programs.
  - DMR response: We are not doing it at expense of IIA programs. Have requested additional funds in FY 15
- Panel has specific recommendations for MIPs beyond Closing the Loop
  - Response: DMR values these recommendations.
  - Currently working on solicitation - dependent on FY 15 appropriation at Request level
- Expect to have workshops going forward to engage the community and get advice on future science targets.