

# APEX Task I FY02 Plans

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# Sub-Task 1

- **Characterization of projected plasma operating conditions in NSTX, C-MOD (PPPL –30 K\$ (Kaita from Task B) ,SNL-Ulrickson \$10K)**

# Sub-Task 2

- **Design and analysis of flowing liquid wall options in NSTX and other operating plasma devices (UCLA- 100 K\$ Huang, Ying, Luo, Morley)**
- MHD modeling of designs for NSTX and C-Mod will be carried out using FLOW 3D and other tools. The objective is to provide design guidance for the design of components for those machines as well as the M-Tor and LIMITS experiments.

# Sub-Task 3

- **LM-MHD initial exploratory experiments with magnetic field gradients and applied currents or with surface heating (UCLA, SNL, ORNL, PPPL)**
- a) Design and execution of an experiment on M-Tor to simulate flow in the NSTX divertor (round or flat streams and/or soaker hose). The liquid will be GaInSn alloy for the initial experiments. The objective is to provide experimental data for validation of the MHD models. (UCLA-100K\$, Luo, Sketchley, Ying, Morley, ORNL-25 K\$ Fogarty, Nelson)

## Sub-Task 3 (cont.)

- b) Design and flow testing of prototype nozzles for NSTX and C-Mod with liquid Li on the LIMITS device at SNL. Both round and flat streams will be tried first. Methods for imposing magnetic fields to test soaker hose and freestanding stream designs will be investigated and testing conducted. After a workable nozzle design is found, high heat flux testing will be conducted to determine the operating range of the design. (SNL-\$78K Nygren, Tanaka, McDonald, Lutz, ORNL-50K\$ Fogarty, Nelson)

## Sub-Task 3 (cont.)

- c) Investigation of methods for adding vertical or radial fields to the M-Tor experiment will be conducted by UCLA and PPPL (Woolley). The objective is to provide a more complete simulation of the field configuration in either NSTX or C-Mod (UCLA-50K\$ Morley, Youssef, Sketchley, PPPL –20 K\$ Woolley, ORNL- 10K\$ Fogarty, Nelson, SNL-\$10K Youchison)

# Sub-Task 4

- **If necessary, to provide assistance to the CDX-U experiment on an as needed basis (pending on present experimental results and community inputs). (PPPL –10 K\$ Kaita task B, SNL~\$10K Ulrickson)**
- Of particular interest are potential ideas for conducting flowing surface experiments on CDX-U. However our assistance will not be limited to that topic.

# Sub-Task 5

- **Identification of key parameters and functionality requirements for the development of an integrated IFE and MFE thermofluid facility. (UCLA-25 K\$ Morley, Ying)**
- Discuss the needs of the IFE community with program leaders and determine what experiments or modeling could be done to support applications of liquid surfaces to IFE devices.