Charge to the FSP Program Advisory Committee (FSP PAC)

Advanced computations at the petascale and beyond, in tandem with experiment and theory, are essential for acquiring the scientific understanding needed to develop whole device integrated predictive models with high physics fidelity. This is the primary motivation for the Fusion Simulation Program (FSP) – a new initiative supported by the offices of Fusion Energy Sciences (FES) and Advanced Scientific Computing Research (ASCR) -- that has just begun the project definition phase. Since ITER and leadership class computing are prominent missions of the DOE, producing such a world-leading experimentally validated predictive capability for fusion represents a key strategic project for the future.

As we begin the project definition phase, the PAC is requested to provide advice on how the FSP team can most effectively produce the key deliverables targeted in the FSP proposal in response to the DOE Request for Proposals (RFP). We are particularly interested in the PAC's input and invite comments on our progress and advice on our plans in three areas:

(1) Science drivers and associated gaps analysis: The definition of the science drivers and the associated analysis of gaps (in the scientific problems targeted by the FSP and in the simulation capabilities needed to treat those problems) are planned to be completed within six months. <u>Do the science drivers and associated gaps analysis presented provide a compelling case for needing integrated modeling to achieve key fusion advances?</u>

(2) The plan for the project definition phase: The goal of the project definition phase is to produce a plan for the 15-year FSP, including the delivery of near-term (< 5 year) software capability of major value to the user community. Development of the multi-year plan includes science needs, physics modules, validation and verification, integration frameworks, and project management. <u>Do the FSP team's plans for project definition provide an appropriate roadmap for accomplishing these tasks, properly prioritized, on a relatively tight time schedule?</u>

(3) Community engagement: The FSP project definition team must engage and include the relevant expertise from the FES and ASCR communities to acquire input helpful to addressing and prioritizing key program definition goals. <u>Do the plans presented provide an effective approach for needed community outreach?</u>