U.S. DEPARTMENT OF ENERGY | Office of Science

NSTX-U

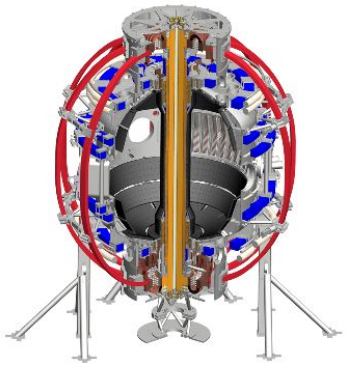
NSTX-U / Magnetic Fusion Science Meeting

Jan. 14, 2019

Agenda

1. Interest in gathering feedback on NAS Burning Plasma study? (*W. Guttenfelder, 5 min*)
2. TRANSP development update: v19.1 (*F. Poli, 5 min*)
3. W7-X update (*N. Pablant, 45 min*)

PPPL



Upcoming meetings, deadlines, ...

- DIII-D ROF (~Feb 12-14)
- PPPL Theory Retreat (Feb 25-26)
- US-EU TTF (Mar 18-21), Austin (*abstracts due Jan. 25*)
- Sherwood (April 15-17), PPPL (*abstracts due Feb. 22*)
- SOFE (June 2-6),
- EPS-DPP (July 8-12), Milan
- Theory & Simulation of Disruptions Workshop (Aug 6-), PPPL
- H-mode WS (Oct. 9-11), Shanghai
- APS-DPP (Oct 21-25), Ft. Lauderdale
- AAPPS-DPP (Nov. 4-8), Hefei

Have you read the NAS BP report? What do you think?!

- Before diving into community activities to address the FESAC charge on "...a new long-range strategic planning activity", as a potential launch point it seems appropriate to develop a community perspective and feedback on the recommendations contained within the NAS Final Report of the Committee on a Strategic Plan for U.S. Burning Plasma Research: https://www.nap.edu/catalog/25331/final-report-of-the-committee-on-a-strategic-plan-for-us-burning-plasma-research (*main text only 122 pages*)

- My personal suggested reading:
  - **Executive summary** (2 pages) + **15 recommendations** @ end of Chapters 3,4,6
  - **Chapter 5** (13 pages) - longer summary of overall strategy & recommendations
  - **Chapter 4** (pp. 4-17 to 4-28, 12 pages) - national program recommendations
  - **Chapter 6** (13 pages) - US program organization recommendations

- **BPO webinar by Mike Mauel, Friday Jan 25, 2:00 EST**

Some random excerpts (underlines are mine)

"Second, the United States should start a national program of accompanying research and technology leading to the construction of a compact pilot plant that produces electricity from fusion at the lowest possible capital cost… A focus on a compact device will accelerate the fusion development path, making it affordable and attractive for industrial participation… Resolving these risks (*in developing a compact pilot plant*) will necessitate the design and operation of new facilities" **(Executive summary)**
"...a large DEMO device no longer appears to be the best long-term goal for the United States program." **(Chapter 1)**.
"In place of a single-step approach to a large fusion demonstration facility (DEMO), the opportunity exists today to start the interconnected science and technology research leading to construction of a compact pilot plant and, ultimately, the production of electricity with a device with significantly lower cost… A research approach that minimizes the capital cost of major research facilities is a less costly pathway to the demonstration of fusion electricity" **(Chapter 4)**

"The details of the next step magnetic fusion research facility should be developed through a coordinated community process that includes consideration of multiple mission elements… The resulting upgrades or new facility should be designed, fabricated, and operated by a national team." **(Chapter 5)**

***"Recommendation*: The committee recommends a new division within U.S. DOE/FES to manage and organize research developing technologies needed to improve and fully enable the fusion power system."** **(Chapter 6)**

- Links to my own Googledocs
  a. All 15 recommendations (2.5 pages)
  b. Additional (cherry-picked?) excerpts (~11 pages) -- not that I endorse all of these. But I would be interested to see how people would vote on them...

Would you like to share your thoughts / feedback in a follow-up meeting?

- Perhaps this should wait for a broader community input process, but we only have ~11 months to provide input to FESAC, and this is only a first step before beginning the actual work

- Would you be interested (or annoyed, or scared) to answer poll questions on the various recommendations and suggestions contained within the NAS report?
  - e.g., “Do you endorse…” with possible answers: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

- Would also consider setting up “Chits” GoogleSheet to gather constructive feedback (e.g. as done for the 2018 community workshops)

- **Better ideas for gathering feedback?**

FESAC charge (Nov. 30, 2018)

This letter requests that the Fusion Energy Sciences Advisory Committee (FESAC) undertake a new long-range strategic planning activity for the Fusion Energy Sciences (FES) program. The strategic planning activity—to encompass the entire FES research portfolio (namely, burning plasma science and discovery plasma science)—should identify and prioritize the research required to advance both the scientific foundation needed to develop a fusion energy source, as well as the broader FES mission to steward plasma science.

In developing recommendations within this long-range strategic planning activity, FESAC should take into account the following aspects:

- Identifying specific research areas, across the entire FES portfolio, in which the U.S. should establish or enhance global leadership.
- Maintaining a healthy and flexible program, which incorporates the roles and contributions of universities, national laboratories, and industry, to deliver science results throughout the next decade.
- Maintaining, upgrading, and/or pivoting current small-, mid-, and large-scale facilities, including DIII-D and NSTX-U, and also initiating new experiments/facilities/projects.
- Identifying international collaborative opportunities or partnerships that can give U.S. scientists access to devices outside of the U.S. with unique capabilities.
- Providing support for private-public partnership ventures.
- Positioning the U.S. to obtain maximum benefits in the ITER burning plasma science era.
- Considering the future budgetary constraints described below, as well as the technical readiness and feasibility for any activity to proceed.

Your report should provide recommendations on the priorities for an optimized FES program over the next ten years (FY 2022-2031) under the following three scenarios with the FY 2019 enacted budget for the FES program as the baseline:

- Constant level of effort (defined as the published OMB inflators for FY 2022-2031)
- Modest growth (use 2% above the published OMB inflators)
- Unconstrained budget: For this scenario, please list, in priority order, specific activities (beyond those mentioned in the previous budget scenarios) that are needed to achieve and maintain a leadership position addressing the scientific opportunities identified by the community.