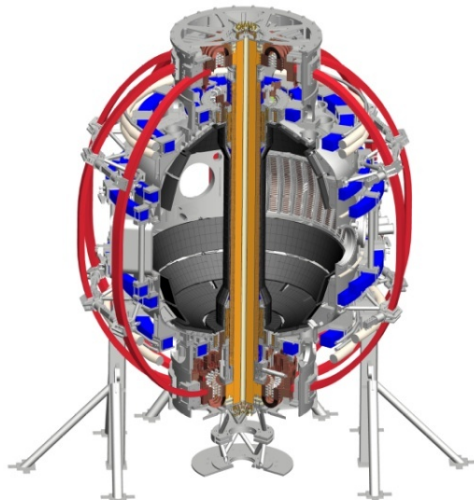


PAC Aftermath for Macroscopic Stability and NCC

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Macroscopic Stability

- What went well during the PAC?
 - The PAC seemed to really key in on the disruption thrust, especially the PAM system and the mitigation systems.
- How do we foresee the recommendations impacting the chapter text and future 5YP review presentations?
 - General: More standardization among the talks: format, year-by-year, even just what we are calling “Year 1, year 2...”
 - General: Calling out “model validation and predictive capability” explicitly?
 - But is this really what we want to do at the 5YP presentations?
 - General: PAC called for more explicit spelling out of what will be done with and without upgrades
 - “The focus on NTV is understandable in view of the group’s leadership in this area, but seems to have all but driven out consideration of the role of resonant forces in phenomena such as locked modes and ELM control.”
 - I covered resonant fields/locked modes on page 9 – PAC missed it?
 - PAC seemed to be looking for ELMs in MS – state that more will be said in Boundary, include additional calculations with IPEC

- What went well during the PAC?
 - The needs for the partial NCC and the analysis effort seemed well received by the PAC
- How do we foresee the recommendations impacting the chapter text and future 5YP review presentations?
 - The PAC pointed out a somewhat biased emphasis of NCC utility on NTV and MS in the presentations: “Presentations emphasize mode-control aspects of NCC at the expense of edge/SOL physics”
 - Action 1: Add analysis to cover other TSG relevant physics and other TSG can add more discussions about impacts and utility of NCC to relevant topics
 - NCC for ELMS: Vlad mentioned it on pages 4 and 9, but not explicitly on page 8 (ELM page).
 - ELM stability analysis: BP can add using ELITE and PEST
 - Heat flux to (snowflake) divertor: MS and BP can add using field-line-tracing
 - Fast ion transport: EP can help using IPEC + SPIRAL
 - Vertical stability control: ASC can help using CORSICA
 - Action 2: NCC FOMs and related physics should be better defined
 - PAC was skeptical of Chirikov parameter.
 - PAC’s suggestion that NTV was overemphasized may also stem from the use of “NTV” in the FOMs as a shorthand to mean “non-resonant”.

backup

Comments on 4th Charge Question

4. *Comment on possible improvements to the NSTX-U 5 year plan presentations including logic and format.*
 - Three key additional capabilities (at least) are contingent on funding scenarios: cryo pump(s), 1-2 MW ECH/EBW, full/partial NCC coil set. Most of the presentations appeared to assume the optimistic +10% funding scenario. *It would be helpful to indicate what physics research will be accomplished with and without these additional capabilities, to more clearly expose the advantages they bring*
 - *The NCC coils offer great potential for investigating 3D physics. The discussion of this capability was mostly confined to macro-stability. The PAC sees the NCC coils as a versatile tool with potential to investigate 3D physics broadly. This is not fully apparent in the presentations.*
 - The prospects for HHFW operation in NSTX-U appear greatly improved. Similar to the NCC coils, HHFW could be viewed as a more versatile tool for a variety of physics studies, including heating, rotation studies, and perhaps impurity control.
 - The presentation of plans for boundary physics studies and plasma-material interactions could be compressed
 - Concern that the organization of the written proposal and presentation by thrusts in topical science areas diffuses the high level goals

Macro-stability and NCC

- NSTX group has played leading role in mode control. The 5YP leverages the existing expertise well and proposes a compelling program.
- The PAC is impressed by the disruption prediction system and encourages work on adapting it to other machines.
- The focus on NTV is understandable in view of the group's leadership in this area, but seems to have all but driven out consideration of the role of resonant forces in phenomena such as locked modes and ELM control.
- Presentations emphasize mode-control aspects of NCC at the expense of edge/SOL physics.
 - ELM suppression: need ballooning mode analysis of perturbed equilibria to understand pacing
 - Interaction of NCC with “snowflake” divertor
 - Effect of Li on NCC ELM pacing
 - Effect of NCC on HHFW coupling
- NSTX has unique capabilities and leverage to help resolve basic physics of edge 3D shaping. The 5YP could be improved with respect to how it communicates the breadth of the NCC program.

Macroscopic Stability questions

- During Stan's talk there was a request for more detail on the electromagnetic particle injector.
- There was a question about the modeling of gas penetration in the scrape off layer.
- There was a request for more detail about the Halo current rotation measurements.
- There was a call for expansion of the disruption PAM system beyond NSTX-U (DIII-D, ITER ITPA joint experiment)
- There was a question about why POCA $n=2$, $n=3$ braking profiles were different.
- There was a question about whether we could reach low, ITER-relevant rotation with the two neutral beams.