

# **NCSX Project Status**

## **Update and Directions**

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Stellarator Working Group Meeting  
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# NCSX Design History and Status

- Have been developing NCSX design based on PBX-M conversion since February.
- Accomplishments
  - Promising plasma configuration developed
  - Coil options and requirements clarified
  - Physics requirements documented
  - Credible engineering concepts identified
  - Large advances in understanding, tools, capabilities.
- However, we have not yet established the reference plasma and coil configuration we need. Issues:
  - Neoclassical confinement and particle orbits at  $B=1$  T are at best marginal for testing limits.
  - Coil current requirements limit pulse length to  $<1/2$  that needed for fully-relaxed profiles.

Intense effort on these two issues since September Project Meeting has solidified these conclusions.
- A full-mission NCSX based on PBX-M conversion appears to be precluded by space limitations, but a reduced-mission design may be possible.  
We may want to come back to this.

# Next Steps

- The proposed mission and the consequent physics requirements are still the right ones for a compact-stellarator PoP experiment.
- Removing the PBX-M torus constraints (TF, VV) will give us greater design freedom which we can use to:
  - Obtain adequate plasma and coil performance.
  - Broaden range of possibilities for reducing cost and accelerating schedule.
- We will shift our focus to analyzing this approach...
  - Develop a machine design that can meet present physics requirements.
  - Assess its cost and schedule implications.
  - By Dec. 2-3 PAC Meeting: assess and compare both approaches; update plan and design schedule (PVR, CDR).

# Near-Term Schedule

## New-Machine Option

- Oct. 16 Initial design point (Zarnstorff)
- Oct. 16 Preliminary plasma configuration (Reiman)
- Oct. 30 Issue plasma configuration; not fully optimized but representative for design purposes. (Reiman)
- Nov. 13 Issue filamentary coil design, ditto. (Hirshman)
- Nov. 25 Assess machine configuration and cost implications. (Reiersen)
- Nov. 30 Assess prospects, update schedule.
- Dec. 2-3 Program Advisory Committee (PAC) meeting.

## Ongoing Tasks

IAEA, APS, requirements, tools, concepts.