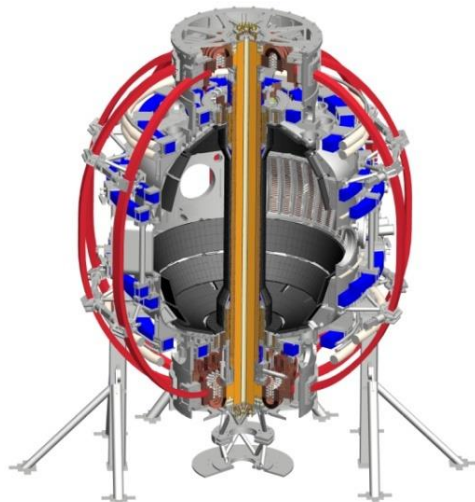


PCTF prioritization discussion

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Particle Control Task Force Meeting
PPPL LSB B318
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ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
ASCR, Czech Rep

Priorities as discussed in pre-forum meetings

- **Task Force Goals (Duration: 2015-2018):**
 - Confirm physics design calculations of the cryopump plenum geometry
 - Deploy a number of long pulse particle control techniques
 - Coordinate effort for density feedback implementation with cryo

Particle Control Task Force – Cryo physics design

- Task Force Goals:
 - Confirm physics design calculations of the cryopump plenum geometry
 - Semi-analytic model and 2-D calculations used for physics design
 - Need divertor thermography, Langmuir probe data, D_α profiles, which should be available relatively early in run
 - Desire to do this with boronized conditions (early) and lithiated conditions, with follow up experiments in 2016 after installation of high-Z row (joint with M&P)

Particle Control Task Force – Techniques (1)

- Task Force Goals:
 - Deploy long pulse particle control techniques
 - Naturally occurring ELM regimes: easy to obtain in NSTX with boronization (early), but can also achieve with lithiumization with ‘low’ amounts of inter-shot deposition (50-100 mg)
 - Lithium Granule Injector (LGI) for ELM triggering in discharges with low natural ELM frequency (some LSN with boronization early, ‘high’ lithium doses for ELM-free)
 - Consider using LGI as tool to controlled B -> Li transition
 - LiTERs to reduce impurity sources
 - Downward facing evaporator available ‘early’, upward facing one in 2016

Particle Control Task Force – Techniques (2)

- Task Force Goals:
 - Deploy long pulse particle control techniques
 - Snowflake divertor and/or gas puffing to reduce divertor T_e and sources (joint with Boundary Science group)
 - Timing of the snowflake likely paced by PCS optimization
 - Can probably do the source study (piggyback early, including e.g. 3-D asymmetries and tile edges) and dedicated gas puffing first with boronized walls (early)
 - Recycling and particle balance can support these
 - Comprehensive suite of diagnostics to support these
 - 3-D fields for ELM destabilization (mostly with Li)
 - Li dropper for destabilization of micro-edge instabilities (2016+)
 - Cryopump + density feedback (2017+)

Particle Control Task Force – Early Priorities

- Early 2015 run priorities:
 - Measure divertor profiles for cryopump physics design validation, under boronized (ELMy) conditions
 - Evaluate efficacy of naturally occurring ELMs for particle control, as basis for future cryo operation under boronized conditions
 - Important to get this for boronized walls in ELMy H-mode: proven density control technique in tokamaks, and a good basis for comparison with Li
 - Impurity sources; particle balance assessed
 - Optimized fueling (joint with ASC)
 - Evaluate LGI, 3D fields for ELM control with boronization
 - Deploy divertor gas puffing, and snowflake if available, with boronized walls
 - *Group discussion: possible early I-mode evaluation?*