Status of Power and Particle Control

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Plasma Boundary Group

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Limiter vs. Divertor Operation:

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- **The plasma-facing components intercept and control the "leaks" of the magnetic bottle.**
- **In NCSX we distinguish 3 types of leaks :**
  - **energy, fast particles, and thermal particles**
- **To intercept and control these leaks, we need to know their location and specific characteristics**

2 Options:

- **Divertor: intercept islands or concentrated stochastic field line areas outside the LCMS** (don't have enough information yet!)
- **Limiter: force the location of the energy and particle "leaks" by inserting limiter modules inside the LCMS**

Objectives

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- **Power handling - staged approach:**
  - **Set of symmetric modular limiters or divertor baffle plates will be designed for:**

→ 6MW - 0.5s

→ 12 MW - 0.5s

→ 6MW - 5s

→ 12 MW - 5s

- **Particle control - thermal particles, energetic particles:**
  - **If initial solution is a set of modular limiters, particle control mostly through wall conditioning** (recycling- and impurity control)
  - **If a divertor becomes an option, primary particle control will be through divertor baffles and secondary particle control through wall conditioning**

Work Approach

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- **Ideal solution and final goal will be divertor baffles for power handling and neutrals control** ==> *iterative approach*
- **However, at this time we don't know the configuration well enough to design a very specific set of PFCs**
- **Hence, we will proceed in parallel as follows:**

1. Generic design of limiters/divertors: work out materials choices, cooling, baking options, mounting, moving mechanisms, etc.

Location and specific shapes will be finalized later.

2. Continue studies of configurations and field line plots at various cross sections for thermal and energetic particles.

- **Initial approach might be a symmetric set of limiters; plus inboard protection limiters?**