

Current Profile Control Studies via Sawtooth Modification with Mode Conversion Current Drive in Alcator C-Mod

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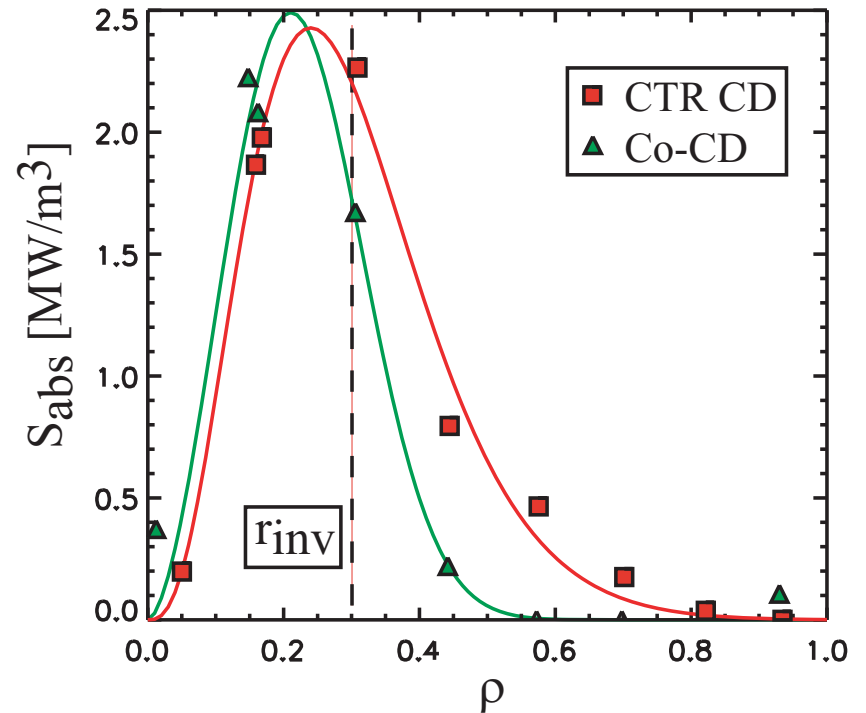
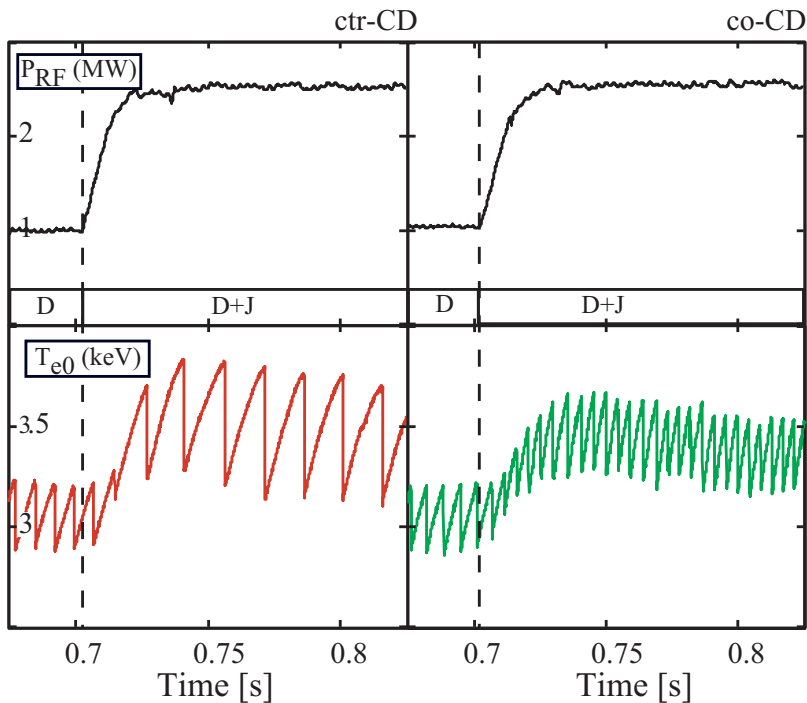
Outline

- What are the physics issues to be addressed?
- What experimental data is to be compared, or what validations studies will be done?
- What components are needed for the work?
- What development is needed to complete the studies? - physics code development, component script development, generalization of IPS time stepping logic ...
- What are the major milestones toward completion and what is the schedule?
- Who is going to do what in the study and when will they do it?
- What publications/presentations are envisaged? What is the schedule for that?

Current Profile Control via Mode Conversion Current Drive

- **Physics issues to be addressed:**
 - Stabilization / destabilization mechanism for sawtooth control.
 - Does ICRF full-wave model predict CD in correct spatial location.
 - Is stability mechanism linear or nonlinear.
- **Experimental data:**
 - Sawtooth “pacing” experiments from C-Mod:
 - Clear variation in sawtooth period with phasing and deposition location.

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- **Components Needed:**

- TSC simulation to evolve the discharge (already working the IPS).
 - **Need stable coupling between MCCD source term and Ohm's Law in TSC.**
- RF TORIC component (working in the IPS):
 - **Ehst-Karney parameterization of CD efficiency.**
 - Electron and ion heating sources.
- Full-wave MCCD computations will require about 511 poloidal modes and 480 radial elements per CD calculation per time step:
 - 6 min. of wall clock time on 2048 processors using new “divide and conquer solver.
- Linear MHD stability component (already in IPS).