

# PROPOSAL ITPA-IOS / 2012 :

## Integrated Magnetic and Kinetic Profile Control

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**Key persons:** to be defined  
**Devices:** DIII-D + other machines with interest in profile control (please volunteer !)

### Background:

- A generic methodology has been developed for **system identification and model-based profile control** on any tokamak, with any actuators, magnetic and kinetic profile measurements. The methodology has been applied on JET, JT-60U and DIII-D, and has a **large potential for magnetic and kinetic profile control in non-inductive, high-bootstrap-fraction discharges**.
- **First closed-loop magnetic+kinetic control experiments have been successful on DIII-D. It is important to do more experiments on DIII-D and to start similar experiments on different devices**, with different sets of actuators and profile measurements to **fully qualify profile control methods**.

### Proposal:

- In 2012, **more control experiments will be proposed on DIII-D**, with **different controllers**, **different current profile targets and  $\beta_N$  targets**, using the new **off-axis beam capability** and including control of the plasma rotation and ion temperature profile.
- **Other devices are contributing** to this activity (TCV) and may participate. Also devices using LHCD as **a current drive actuator** have shown interest in 2011 : e.g. **Alcator C-Mod, Tore Supra**). What about JET, ASDEX-UG, EAST, KSTAR, etc ... ?).
- **Modelling of integrated control experiments** (e.g. DIII-D) as well as **simulations for future devices** (ITER, JT-60SA ?) will also be performed in parallel.