ITER Scientist Fellow (Plasma Control)

Purpose

The aim of this fellowship is to support the ITER Project and, in particular, the ITER Organization Central Team (IO-CT) through contributions to the development of Plasma Control on ITER. This involves developing plasma control algorithms and support functions and may include the development of plasma control modelling tools within the Plasma Control System Simulation Platform (PCSSP). Among the control areas of interest to ITER are axisymmetric magnetic control, fueling and impurity control, first wall and divertor heat flux control, plasma stored energy control, fusion burn control, plasma current density, rotation, and temperature and pressure profile control, MHD instability and error field control, event handling, and shared actuator management as well as support functions for forecasting, error field reconstruction, plasma boundary and equilibrium reconstruction. The work involves close collaboration with the IO-CT and with modelling and experimental efforts performed within the ITER Members’ fusion community and with the relevant ITPA activities.

Major Activities

- Contributes to the development of plasma control algorithms and/or support functions for application on ITER;
- Develops plasma control models and/or experiments on existing devices to test potential control schemes or support functions for ITER;
- Develops control models within the Plasma Control System Simulation Platform (PCSSP) to support the development of control schemes or support functions for ITER operation;
- Develops simplified models to forecast plasma stability and control boundaries for pulse validation and/or real-time applications;
- Develops real-time plasma boundary and/or equilibrium reconstruction codes for application to ITER;
- Develops error field reconstruction codes for offline analysis or real-time application to ITER;
- Contributes to the development of event detection and exception handling schemes for application to ITER;
- Contributes to the development of actuator management schemes to ensure efficient and effective use of the limited set of actuators on ITER for multiple simultaneous or sequential control schemes on ITER.

Qualifications and Experience

- **Education/ Know-How:**
  - Extensive education and/or experience in the development and implementation of control algorithms and/or modelling tools for control applications
- **Technical experience:**
  - Knowledge of how to control plasma behavior, particularly in tokamaks or other fusion devices, is preferred
  - Knowledge of Matlab/Simulink and/or other software tools used in control applications
- **Social skills:**
  - Ability to communicate effectively;
– Ability to work effectively in a multi-cultural environment;
– Ability to work within a team and to promote team work.

• **Language requirements:**
  – Fluent in English (written and spoken).

• **Computer and IT skills:**
  – Expertise in numerical techniques for the implementation of sophisticated control simulation and analysis tools.