Job Title: Coordinating Scientist, Pulse Design IO0121

Requisition ID **6841** - Posted - (France, 13067 St Paul Lez Durance Cedex) - **Science and Technology Expertise - New Posting**

The ITER Organization brings together people from all over the world to be part of a thrilling human adventure in southern France—building the ITER Tokamak. We require the best people in every domain.

We offer challenging full-time assignments in a wide range of areas and encourage applications from candidates with all levels of experience, from recent graduates to experienced professionals. Applications from under-represented ITER Members and from female candidates are strongly encouraged as the ITER Organization supports diversity and gender equality in the workplace.

ITER Organization (IO) is an Equal Opportunity/Inclusive organization committed to diversity in the workplace, with diversity and Inclusiveness being one of the ITER Values.

As IO attracts and retains people coming from a vast array of different backgrounds and cultures, bias and exclusion cannot be tolerated. IO believes it is our diverse perspectives and backgrounds that gives unique strength and value to the ITER mission, regardless of race, member nation, gender, religion, status, sexual orientation, or disability - all are welcome and respected at ITER.

Our working environment is truly multi-cultural, with 29 different nationalities represented among staff. The ITER Organization Code of Conduct gives guidance in matters of professional ethics to all staff and serves as a reference for the public with regards to the standards of conduct that third parties are entitled to expect when dealing with the ITER Organization.

The south of France is blessed with a very privileged living environment and a mild and sunny climate. The ITER Project is based in Saint Paul-lez-Durance, located between the southern Alps and the Mediterranean Sea—an area offering every conceivable sporting, leisure, and cultural opportunity.

To see why ITER is a great place to work, please look at this video

Application deadline: 12/03/2023
Domain: Science & Operation Domain
Department: Science, Controls & Operation Department
Division: Science Division
Section: Experiments & Plasma Operation Section
Job Family: Scientific Coordination
Job Role: Coordinating Scientist
Job Grade: P4
Language requirements: Fluent in English (written & spoken)
Contract duration: Up to 5 years

Purpose

As Coordinating Scientist for ITER Pulse Design, you will assume the leading role in the development and application of the software platform which will be used to design, simulate and verify (against plant system operational limits) plasma pulses to be run on ITER; the Pulse Design Simulator (PDS). In addition to leading, coordinating and participating in the PDS's forward development, you will establish and participate in a broad programme of benchmarking the software against current tokamak experiments within the ITER Members' institutions and other scenario simulation tools. You will be a strong contributor to the design of ITER scenarios in support of the ITER Plasma Control System (PCS) development and will be expected to participate in activities supporting the development of High Fidelity Plasma Simulators (HFPS), integrating appropriate HFPS modules into the PDS wherever possible.

Background

The PDS is currently in the initial development phase in the ITER Science Division, with a workflow engine in place coordinating initial physics modules required to develop ITER First Plasma scenarios. It will be progressively expanded in stages, in line with the ITER Research Plan, to include much broader capability, right up to scenario design for burning plasma operation. It operates within the ITER Integrated Modelling Analysis Suite (IMAS), and is intended to simulate essentially all aspects of pulsed operation on ITER, eventually including the use of PCS controllers. In comparison with HFPS, also being developed at ITER, the PDS must execute rapidly since it is to be used as a routine pulse design tool, requiring the use of reduced models to describe some aspects of plasma behaviour. It must also link with the CODAC Configuration, Verification and Validation Framework (CVVF) to ensure that a given pulse will operate within the plant system operating limits and conditions. It should also provide the inputs required for the ITER Pulse Schedule Preparation System to write ITER Pulse Schedules based on PDS pulse designs.

Key Duties, Scope, and Level of Accountability

- Leads the development of all aspects of the ITER PDS, including definition and coordination of dedicated external contract activities and additional contributions leveraging expertise within ITER Members institutions and internal resources;
- Defines and executes, along with Science Division management, the roadmap for PDS development required to provide ITER pulse designs which meet the needs of the ITER Research Plan making use of external contracts, internal resources and voluntary contributions from the ITER Members;
- Defines and prepares technical specifications for external contracts dedicated to the development of physics modules and PDS workflow capability;
- Defines, coordinates and executes in-house and voluntary activities to support PDS development;
- Ensures the proper integration (version control, continuous integration, testing) of all PDS components within the IMAS environment;
- Becomes an expert PDS user, acting as central point of contact for internal and external users of the platform, providing complete and continuously updated online documentation of the PDS platform;
- Ensures tight coordination with ITER CODAC and Operations Divisions to ensure appropriate links between the PDS and Pulse Scheduling and plant Operating Limits and Conditions;
- Ensures the implementation of control models within the PDS such that exchange of controllers developed within the Plasma Control System Simulation Platform can be enabled through an appropriate IMAS interface;
- Defines, coordinates and pursues a program of PDS testing against experimental tokamak scenarios obtained on suitable current devices operating within the ITER Member's institutions;
- Establishes and deploys systems and processes for PDS testing and refinement against interpretive simulations operating within IMAS to ease validation against experimental results;
- Contributes to the design of ITER plasma scenarios for First Plasma and subsequent operation phases within the ITER Research Plan;
- Supports the development of the ITER HFPS, integrating appropriate HFPS modules into the PDS wherever possible.
- Collaborates across IO and with external stakeholders and networks (e.g. ITPA, ISFN) to exchange and/or confirm information relevant to the PDS development;
- Supervises ITER staff and visiting researchers contributing to studies in areas related to plasma scenario design and PDS development;
- May be required to work outside ITER Organization reference working hours, including nights, week-ends and public holidays.

Measure of Effectiveness

- Efficiently manages all aspects of PDS development, including through external contracts and in-house effort, ensuring timely and technically compliant delivery;

- Successfully supports the planning for ITER commissioning and operation in the areas of First Plasma scenario design;
- Contributes to plasma scenario design activities beyond First Plasma in support of the ITER Research Plan and the PCS;
- Ensures up-to-date and accessible PDS documentation for internal and external users;
- Interacts with and co-ordinates efficiently experts from within the ITER Members in the definition, implementation and monitoring of activities in his/her area of responsibility;
- Ensures good coordination between the ITER Science Division and the Operations and Controls divisions for all aspects related to the PDS;
- Communicates well and maintains high professional standards when interfacing with staff in the area of plasma scenario design and simulation from the ITER Organization and ITER Members' R&D institutions and Domestic Agencies.

Experience & Profile

- ***Professional Experience:***
  - At least 8 years' experience in fusion plasma physics, preferably including a strong component of tokamak plasma scenario design/plasma simulation;
- ***Education:***
  - PhD degree or equivalent in plasma physics, tokamak science or other relevant discipline;;
  - The required education degree may be substituted by extensive professional experience involving similar work responsibilities and/or additional training certificates in relevant domains.
- ***Language requirements:***
  - Fluent in English (written and spoken).
- ***Technical Competencies and demonstrated experience in:***
  - Design of tokamak pulses through integrated tokamak plasma simulations;
  - Validation of designed tokamak scenarios with plasma experiments through integrated tokamak plasma pulse simulations
  - Numerical techniques for implementation of plasma simulation and analysis tools;
  - Development and management of high-performance scientific software, including integration of elements within workflows and user interfaces;
  - Programming languages commonly used in fusion plasma simulation applications and workflow management (e.g. Fortran, Python, C/C++);
  - Management of international collaborations and demonstrated ability to represent an international organization such as ITER;
  - Knowledge or experience in the following areas considered an advantage:
    - Experience with the IMAS environment;
    - Interpretive analysis of existing tokamak plasma experiments through transport simulations;
    - Knowledge/experience of the key elements of tokamak plasma control;
    - Knowledge of Machine Learning techniques;
- ***IO Core Behavioral Competencies:***
  - Collaborate: ability to facilitate dialogue with a wide variety of contributors and stakeholders;
  - Communicate effectively: ability to adjust communication content and style to deliver messages to work effectively in a multi-cultural environment;
  - Drive results: ability to persist in the face of challenges to meet deadlines with high standards;
  - Manage complexity: ability to analyze multiple and diverse sources of information to understand problems accurately before moving to proposals;
  - Instil trust: ability to apply high standards of team mindset, trust, excellence, loyalty and integrity.

The following important information shall apply to all jobs at ITER Organization:

- Maintains a strong commitment to the implementation and perpetuation of the ITER Safety Program, ITER Values (Trust; Loyalty; Integrity; Excellence; Team mind set; Diversity and Inclusiveness) and Code of Conduct;
- ITER Core Technical Competencies (Knowledge of these competencies may be acquired through on-board training at basic understanding level for all ITER staff members) :
  1) Nuclear Safety, Environment, Radioprotection and Pressured Equipment
  2) Occupational Health, Safety & Security
  3) Quality Assurance Processes
- Implements the technical control of the Protection Important Activities, as well as their propagation to the entire supply chain;
- May be requested to work on beryllium-containing components. In this case, you will be required to follow the established ITER Beryllium Management Program for working safely with beryllium. Training and support will be provided by the ITER Organization;
- May be requested to be part of any of the project/construction teams and to perform other duties in support of the project;
- Informs the IO Director-General, Domain Head, or Department/Office Head of any important and urgent issues that cannot be handled by line management and that may jeopardize the achievement of the Project's objectives.
- For staff expected to perform on-call, shift hours, or other work outside ITER Organization reference working hours, including nights, weekends, and public holidays, the possession of a driving license valid in France is required. No commuting vehicle will be provided by the ITER Organization.