OFFRE DE STAGE / ALTERNANCE

* Champ bloquant

Information générales

Entité de rattachement*	SI2P/GP3
Référence interne/ Plan Emploi	Sans objet
Description de l'unité	The *Institut de Recherche sur la Fusion par Confinement Magnétique* (IRFM) is part of the Fundamental Research Department at CEA. For more than 50 years, its has been its mission to drive research on a novel energy source, magnetic confinement fusion, by participating in the European fusion programme. IRFM is located at the Cadarache CEA research centre. Its activities are structured around three axes : - contribute the ITER project and the accompanying programme (mainly the JT-60SA tokamak), - prepare the scientific ITER operation through experiment and control activities as well as theory and modelling, - establish a sound basis for a future nuclear fusion reactor. These activities are intimately connected with a particular effort of training future generations of fusion physics and technology experts. IRFM maintains and uses numerous R&D and test platforms, among which the main one is the WEST (Tungsten (W) Environnement Steady-State Tokamak) tokamak , designed as a testbench for ITER. It allows to test one of the key ITER components and to pursue plasma physics research in an international context, thanks to the numerous collaborations with the fusion teams worldwide.
Délai de traitement	3 mois

Description du poste

Domaine*	Instrumentation, métrologie et contrôle
Intitulé de l'offre*	Modelling of infrared imaging systems in a tokamak
Contrat*	Stage
Sujet de stage* (précisez la durée du stage)	Adjustment and reliability of a synthetic diagnostic for a better interpretation of infrared imaging systems in a tokamak Duration of the internship: 6 months
Description de l'offre*	In magnetic fusion devices (tokamak), Infra-red (IR) thermography system are key diagnostics to monitor the surface temperature of the Plasma Facing Components (PFC) under plasma exposure. This measurement system has a double function: (1) ensuring the wall protection of excessive heat loads (2) understanding the plasma-wall interaction with accurate quantitative measurements. Nevertheless, the interpretation of IR measurement in metallic environment is difficult due to several perturbative phenomenon as the emissivity variation and the presence of parasitic flux coming from multiple reflections within the tokamak. For a better interpretation and reliability of IR measurement, new imaging techniques able to solve this perturbative phenomenon are under development. Based on Artificial Intelligence (AI) techniques or inversion methods using reduced models, these methods aim retrieving parameters of thermal scene (temperature or emissivity) by comparing experimental image to numerical model. Now so that this comparison is effective, a first step is to be sure that input models are quite coherent and adjuster with the real world. The objective of this internship is to make more reliable the numerical model (so-called infrared synthetic diagnostic) basing on experimental data of WEST tokamak in order to generate database of simulated images, which will use for artificial intelligence algorithm. The work of student will be: 1) Adjust the camera model used as input of synthetic diagnostic. Which includes a. Spatial (geometrical) calibration of WEST camera to adjust synthetic and experimental views on 3D model b. Modelling optical effects (distortions, diffractions, aberrations) 2) Generate optimal data base of simulated images for machine learning techniques including a sensitivity study to estimated parameters
Moyens / Méthodes / Logiciels	Monte Carlo Ray Tracing Code, OpenGL, Plan d'expérience
Profil du candidat	Master 2 or equivalent, optic/imaging/data base/computer sciences , with an interest in academic research

Localisation du poste à pourvoir

Site	Cadarache
Lieu	F-13108 SAINT PAUL LEZ DURANCE cedex
Possibilité de poursuite en thèse	oui

Critères candidat

Diplôme préparé	Bac+5 - Master 2
Formation recommandée	
Possibilité de poursuite en thèse	oui

Programme

Segment CEA	Fusion nucléaire

Langues

Langues souhaitée*	Anglais
Niveaux*	Intermédiaire

Suivi RH

Disponibilité de poste*	01/02/2021