OFFRE DE STAGE / ALTERNANCE

* Champ bloquant

Information générales

Entité de rattachement*	SPPF/GTS
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*	Physique du noyau, atome, molécule
Intitulé de l'offre*	Electromagnetic instabilities in a magnetised plasma
Sujet de stage*	Magnetised plasmas are subject to macroscopic instabilities, which can lead to a fast termination of the plasma, and thus determine the operational domain of a fusion device. Macroscopic instabilities are usually studied by using a fluid description of the plasma, namely MagnetoHydroDynamics (MHD). This line of research has produced so far results in accordance with measurements. Nevertheless, it is also known that kinetic effects play an important role in the dynamics of these MHD instabilities, in particular in weakly collisional plasmas. These kinetic effects are expected to be important in ITER, a next step device that is being built at Cadarache. Another related issue is the interaction of MHD modes with the surrounding turbulent background, which is kinetic in essence. These facts motivate the study of large scale electromagnetic instabilities with a kinetic code.
Description de l'offre*	The workhorse of this study will be the GYSELA code, which is being developed at IRFM within an international collaboration in Europe and Japan for about 20 years. GYSELA is a High Performance Computing code which solves gyrokinetic Vlasov equations for electrons and ions in a tokamak magnetic configuration. Once distribution functions are known, charge densities are computed and used to solve a Poisson equation and thus update the electric potential at each time step. This version is well tested and has proved useful to compute a global electrostatic turbulence in tokamak magnetised plasmas. Recently the GYSELA code has been upgraded to compute the perturbed current densities. A routine that solves the Ampère equation has been added, to calculate a self-consistent perturbed magnetic field. These developments open the way towards a comprehensive study of large scale electromagnetic instabilities within the gyrokinetic framework. So far the code has successfully been able to compute a classical instability drie 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.
Moyens / Méthodes / Logiciels	Physique des plasmas, programmation sur calculateur haute performance.
Profil du candidat	Idéalement double formation en physique des plasmas et sciences du numérique. Niveau Master 2 et/ou école d'ingénieurs. Propension souhaitable pour le développement de code hautement parallélisé.

Localisation du poste à pourvoir

Site	Cadarache
Lieu	F-13108 SAINT PAUL LEZ DURANCE cedex

Critères candidat

Diplôme préparé	Bac+5 - Master 2
Formation recommandée	Physique des plasmas / sciences du numérique
Possibilité de poursuite en thèse	non

Programme

Segment CEA	Fusion nucléaire

Langues

Langues souhaitée*	Anglais
Niveaux*	Courant

Suivi RH

Suivie par (nom du tuteur)	Coquillat Anne
Disponibilité de poste*	mars-21