

Année universitaire / Academic year 2020-2021

PROPOSITION DE STAGE M1-M2 / M1-M2 INTERNSHIP PROPOSAL

Institution & Laboratory: Aix-Marseille Université, PIIM lab., group Atomic Physics and Transport in Plasmas

Adresse du lieu de stage / Lab address : Campus St Jérôme, Av. Escadrille Normandie Niemen, Marseille

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Internship conditions (salary, travel, lodging, food,...) : **Gratification for M2, M1: possible funding by ISFIN**

Title: **Atomic processes for magnetic fusion plasmas in open access numerical codes**

Abstract: All magnetic fusion devices are surrounded by a multitude of diagnostics systems allowing to characterize both the confined plasma region and the peripheral one when the plasma interacts with the containing material. Based on various techniques, these systems of different types allow the determination of several plasma parameters with different accuracies and low or high spatial and temporal resolution. However many of these systems share the need of atomic and radiative data as the plasma behavior strongly depends on the interactions of the plasma constituents, i.e., electrons, ions and neutrals of different species interact with electromagnetic waves of different frequencies. In particular, atomic processes are crucial for the analysis of spectroscopic measurements. This internship is an opportunity for a motivated M1 student to discover what is behind emission spectra through the underlying atomic and radiative processes. To reach this aim, it is proposed to the candidate to use open access atomic and data analysis codes like the Flexible Atomic Code FAC [1-2] and open-ADAS [3]. This will allow the student to get familiar with programming with python and to approach the field of magnetic fusion from a theoretical side to get an overview as complete as possible of this plasma physics field.

References:

[1] M F Gu, Canadian Journal of Physics, **86** 675 (2008)

[2] <https://www-amdis.iaea.org/FAC/>

[3] <https://open-adas.ac.uk/>