

DRF: Thesis SL-DRF-19-0590

RESEARCH FIELD

Plasma physics and laser-matter interactions / Corpuscular physics and outer space

TITLE

Investigation of tungsten transport from divertor target plates to core plasma and radiation self-regulation

ABSTRACT

The physics of burning plasmas and prediction of plasma performance are complex problems that need innovative solutions to meet the requirement of experimental analysis and plasma operation. In particular, the use of Tungsten as main plasma facing material (as chosen for ITER) has the drawback of a strong interaction between the edge plasma and the core plasma's energy confinement. More precisely, high energetic plasmas can erode the plasma facing component surface, contaminating the core plasma with tungsten that may radiate a significant power, reducing the energy confinement. To better understand and evaluate the coupling between core and edge plasma due to Tungsten, this PhD proposal will focus on modelling with a single numerical tool tungsten sources and transport from the tokamak wall to the core where its interaction with the main plasma (radiation) will be taken into account self-consistently. Simulations will be compared with experiments on the WEST tokamak. The student will be involved in the experimental team and may have to propose an experimental plan on WEST to validate tungsten sources & transport models.

LOCATION

Institut de recherche sur la fusion par confinement magnétique
Service Intégration Plasma Paroi
Groupe Physique du Plasma de Bord
Place: Cadarache
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