

DEN: Thesis SL-DEN-19-0064

RESEARCH FIELD

Radiation-matter interactions / Physique de l'état condensé, chimie et nanosciences

TITLE

Electronic excitations in heavy ion irradiations

ABSTRACT

Swift ion irradiations are central to many industrial applications and not only for the nuclear industry. Think of the electronics and of the solar panels on board of artificial satellites subject to the solar wind. Moreover, nuclear medicine uses ion irradiation to eradicate tumors.

In order to quantify the damage and the implantation of the ions, it is compulsory to establish accurate data for the ion-matter interaction. This interaction mainly occurs through the electronic excitations.

As electrons are quantum particles, quantum mechanics is of course the right level of description.

We propose in this thesis to produce a computer code using the most fundamental laws of the quantum mechanics to describe the violent electronic excitations induced by the irradiation. We will more specifically target to the swift heavy ion irradiations that are still beyond the capabilities of our existing tool and for which the experimental data are still scarce today.

LOCATION

Département des Matériaux pour le Nucléaire
Service de Recherches Métallurgiques Physiques
Service de Recherches de Métallurgie Physique
Place: Saclay
Start date of the thesis: 01/10/2019

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