

Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars)

Proposition de stage (**ne pas dépasser 1 page**)

Date de la proposition : 08/11/2013

Responsable du stage / internship supervisor:

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Nom du Laboratoire / laboratory name: Laboratoire Aimé Cotton

Code d'identification : UPR 3321 Organisme : CNRS
Site Internet / web site: www.lac.u-psud.fr
Adresse / address: Bâtiment 505, campus d'Orsay
Lieu du stage / internship place: IDRIS, bâtiment 506, Campus d'Orsay

Titre du stage / internship title: Improving cooling and trapping of diatomic molecules

Résumé / summary

Laser-cooling techniques have proven to be very efficient to bring atoms down to temperatures close to the absolute zero, which enabled physicists to explore new and intriguing phenomena. However, it is generally not possible to cool down molecules with lasers, except for a few molecules including SrF (strontium fluoride) [1], due to their exceptional spectroscopic properties. In order to fully understand the cooling and trapping mechanisms, it is necessary to characterize the interaction between a molecule and the external fields to which it is submitted.

In this internship, we propose to calculate theoretically the lowest energy levels of a SrF molecule placed both in an electric and a magnetic field with an arbitrary angle. Those fields create a potential energy for the molecule center of mass, which determines the cooling and trapping conditions. The goal of the project is to find the conditions, in particular the angle, allowing for the most efficient cooling and trapping process. This theoretical work will be in close relationship with new experiments performed in Laboratoire Aimé Cotton.

[1] E. S. Shuman, J. F. Barry, D. DeMille, *Nature* **467**, 820-823 (2010).

Toutes les rubriques ci-dessous doivent obligatoirement être remplies

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : Yes

Si oui, financement de thèse envisagé/ financial support for the PhD: Ecole doctorale EDOM

Lasers, Optique, Matière	X	Lumière, Matière : Mesures Extrêmes	
Plasmas : de l'espace au laboratoire			

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