

Année universitaire / Academic year 2020-2021

PROPOSITION DE STAGE / INTERNSHIP PROPOSAL

Organisme / Institution : Aix-Marseille Université

Laboratoire / Laboratory : PIIM -CIML

Adresse du lieu de stage / Lab address : *Campus de Saint-Jérôme; Service C21, Avenue Escadrille
Normandie-Niémen, 13397 Marseille cedex 20*

Responsable de stage / Supervisor : Jofre Pedregosa Gutierrez

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Conditions de stage (rémunération, voyage, logement, cantine, ...) / internship conditions (salary, travel, lodging, food,...) : rémunération possible

“Double Electromagnetic Induced Transparency cooling”

Laser cooling is a technique used typically in conjunction with trapped atoms or ions, and it has enabled a multitude of experiments and discoveries. In many experimental situations, it is suitable to perform ground state cooling and/or achieve a fast cooling. A promising scheme to achieve it is the Double Electromagnetic Induced Transparency (EIT) cooling, introduced by Evers et al in 2004 [1]. The results presented in [1] use some simplifications (spontaneous decay on the cooling transition only) which are perfectly justified for some ion species (i.e. Ca⁺) but that they are not suitable for some of the species of interest of quantum computing (i.e. Ba⁺).

During this master project, the student will explore (analytical and numerical) the use of the Double-EIT protocol on the Ba⁺ ion in the context of a collaboration with the group of M. Mukherjee at the Center for Quantum Technologies, Singapore.

The student is expected to have some knowledge about laser-atom interaction and to be comfortable with the Python programming language.

[1] Evers and Keitel; Europhys. Lett. 68, 370 (2004)