

Internship in laser spectroscopy

Development of Ionisation schemes for laser spectroscopy studies

The study of exotic nuclear matter and related radioactive ion beam technologies is at the forefront of modern subatomic physics. Atomic physics techniques - more specifically, optical measurements of the atomic structure - readily yields fundamental and model independent data on the structure of ground and isomeric nuclear states. The competition and balance between nuclear shell and collective effects results in a spectacular range of shapes and sizes within nuclear systems. Such shapes and structures perturb the atomic energy levels of atoms and ions at the ppm level and although this is a small absolute effect, it is readily probed and measured by modern laser spectroscopic methods. These techniques are particularly suitable for the study of short-lived radionuclides with lifetimes as short as a few milliseconds, and production rates often only a few hundred isotopes/isomers per second.

Prior the study of the most exotic nuclei, it is necessary to examine the atomic structure of the naturally produced counterpart, thus to assure that the atomic level scheme to be used is sensible to the nuclear properties, therefore suitable for extracting the nuclear parameter such as mean squared charge radii, spins and nuclear moments.

The goal of this master is then to study different atomic structure levels of Pd and In isotopes and to obtain the best atomic scheme for later studies on radioactive isotopes.

Expected skills

Good English communication skills and programming

This work can be pursued by a PhD-thesis

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