



ID de Contribution: 525

Type: **oral contribution**

First results from ATLANTIS - A new collinear laser spectroscopy setup at Argonne National Laboratory

mardi 6 juin 2023 14:30 (15 minutes)

The region of refractory metals, below the magic number $Z = 50$ is of particular interest for nuclear physics studies and exhibits phenomena such as deformations, shape coexistence and hints of triaxial nuclei. Laser spectroscopy has provided valuable and complementary input, providing information about the shape, size and electromagnetic moments of radioactive isotopes and isomers in this region. The CARIBU californium-252 fission source at Argonne National Laboratory can uniquely produce sufficiently intense low-energy ion beams of neutron-rich isotopes in this part of the nuclear chart. Therefore, the new collinear laser spectroscopy setup, ATLANTIS –the Argonne Tandem hall LAsEr beamliNe for aTom and Ion Spectroscopy–was installed at the low-energy branch of CARIBU.

The setup includes a dedicated open-gate cooler-buncher that prepares and delivers cooled ion beams with minimal energy and time spread and a laser ablation source to produce stable isotope beams. The laser spectroscopy beamline is fitted with a low-energy charge exchange cell suited for high-temperature application to also allow spectroscopy on atomic beams and a highly efficient 4π mirror system to collect fluorescence ions.

In this talk, the results of the first measurements of short-lived isotopes of palladium and ruthenium obtained at ATLANTIS will be discussed, and an outlook of future laser spectroscopy endeavors at Argonne National Laboratory will be given.

This work was supported by DFG –Project-Id 279384907-SFB 1245, BMBF 05P19RDFN1 and NSF Grant No. PHY-21-11185, and by the U.S. Department of Energy, Office of Nuclear Physics, under Contract No. DE-AC02-06CH11357, with resources of ANL’s ATLAS facility, an Office of Science User Facility.

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Classification de Session: parallel session

Classification de thématique: ground-state properties