



Contribution ID: 84

Type: **Oral contributed talk**

Online commissioning and current status of CLaSsy at RAON

Tuesday, 21 October 2025 09:40 (20 minutes)

The online commissioning experiments of CLaSsy, a Collinear Laser Spectroscopy setup at RAON, were conducted at the end of 2024 with KNUE and CENS collaborators, observing the optical D1 and D2 transitions for sodium isotopes (^{21}Na , ^{22}Na and ^{23}Na). The isotopes were provided in the form of bunched beams with a repetition rate of 10 Hz using the Radio Frequency Quadrupole-Cooler Buncher (RFQ-CB) at the ISOL facility at RAON. The collinear and anti-collinear geometries were alternately employed to measure the fluorescence spectra as a function of the acceleration voltage of the post accelerator. As a result, the input ion beam energy was precisely measured from Doppler shifts of the two spectra in different geometries. The kinematic compression of Doppler broadening at ~ 20 keV beam energy provided a sufficient spectral resolution to observe the hyperfine structure of the $^2S_{1/2}$ ground state and the $^2P_{1/2}$ excited state, whereas the resolution for the hyperfine splitting of the $^2P_{2/3}$ excited state was limited. To improve the spectroscopic resolution, a high-resolution laser spectroscopy with two independent laser beams in a combined collinear and anti-collinear geometry has been under development. In this talk, we present the commissioning results and an outlook on future experiments of CLaSsy.

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Classification

Instrumentation for radioactive ion beam experiments

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Session Classification: Instrumentation for RIB experiments I

Track Classification: Instrumentation for radioactive ion beam experiments