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## Status and improvements of the LASPEC-prototype TRIGA-LASER

The TRIGA-LASER setup is the prototype of the LASPEC experiment at the future FAIR facility, where collinear laser spectroscopy will be applied to extract nuclear charge radii, spins and nuclear moments of short-lived radioactive isotopes produced by the Super-FRS [1]. Since it is being developed as part of the TRIGA-SPEC experiment [2] at the research reactor TRIGA Mainz, it will be supplied with short-lived radioactive isotopes which are produced by neutron-induced fission of  $^{235}\text{U}$ ,  $^{239}\text{Pu}$  or  $^{249}\text{Cf}$  inside the reactor and ionized in an online ion source.

Collinear laser spectroscopy is strongly facilitated by an RFQ cooler and buncher: Restricting the photon detection to times when an ion bunch arrives at the detection region reduces the laser-induced background by four to five orders of magnitude [3]. As a first test of the newly developed FPGA-based time-resolved data acquisition [4] and the TRIGA-SPEC RFQ, the hyperfine structure of  $^{43}\text{Ca}^+$  was recorded with cooled and bunched ions. This brings the TRIGA-LASER experiment very close to the spectroscopy of radioactive ions produced by the online ion source.

Spectroscopy was carried out on stable calcium ions using an offline ion source installed directly at the TRIGA-LASER beamline. These measurements of the D1 and the D2 line of  $\text{Ca}^+$  ions supported by the frequency comb allowed us to considerably improve the accuracy of the isotope shift in the D2 line compared to literature.

The improvement of the data acquisition and the measurements of the calcium-D2-line will be presented.

[1] D. Rodriguez et al., Eur. Phys. J. Special Topics 183, 1-123 (2010)

[2] J. Ketelaer et al., Nucl. Instr. Meth. A 594, 162 (2008)

[3] A. Nieminen et al., Phys. Rev. Lett. 88, 094801 (2002)

[4] S. Kaufmann, Diploma thesis (2013)

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### Invited Talk (yes/no)?

no

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