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## The TRIGA-SPEC experiment: coupling to the research reactor TRIGA Mainz, beamline optimization and recent results

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Experimental data of ground-state properties of exotic nuclides are important for nuclear structure and reaction studies. They also benchmark the predictive power of astrophysical models. The TRIGA-SPEC experiment - comprising the collinear laser spectroscopy setup TRIGA-LASER and the double Penning-trap mass spectrometer TRIGA-TRAP - is built to perform high-precision measurements on fission products and long-lived transuranium nuclides. Laser-spectroscopic measurements will provide model-independent information on nuclear ground-state and excited-state properties such as magnetic dipole and electric quadrupole moments as well as the change in the nuclear charge radius. Direct mass measurements allow determining nuclear binding energies and  $Q$ -values.

The TRIGA-SPEC facility is coupled to the research reactor TRIGA Mainz. Here, fission products produced by neutron-induced fission of U-235 or Cf-249 targets are extracted by an aerosol-based gas-jet system and are guided through a skimmer system to a surface ionization ion source, which is heated by electron bombardment to temperatures of about 2000°C. We recently implemented an aerodynamic lens, which improves the transmission through the skimmer by collimating the particle beam of the gas-jet system, thereby boosting the injection efficiency into the ionizer.

The 30 keV ion beam from the on-line ion source is mass separated in a 90° dipole magnet, then cooled and bunched in a radio-frequency quadrupole cooler/buncher (RFQ). The RFQ generates short bunches of low-energy ions suitable for injection into the Penning-trap and for collinear laser spectroscopy studies.

In addition, an off-line laser ablation ion source, using a frequency-doubled Nd:YAG laser, is available for TRIGA-TRAP, in order to perform reactor-independent mass measurements of stable and long-lived nuclei, including transuranium element isotopes.

The latest results concerning the performance of the beamline will be presented. Furthermore an overview of current mass measurements of transuranium nuclides at the TRIGA-SPEC experiment is given.

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