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TRIGA-SPEC: Status of the MATS and LaSpec prototype systems for the FAIR facility

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The TRIGA-SPEC facility at the TRIGA research reactor at the University of Mainz is dedicated to high-precision measurements of ground-state properties of neutron-rich radionuclides far from stability. TRIGA-SPEC consists of the Penning-trap mass spectrometer TRIGA-TRAP and the collinear laser spectroscopy setup TRIGA-LASER. The measurements provide access to nuclear binding energies, Q -values, charge radii, nuclear spins and moments. The collection of such data allows testing the predictive power of mass models, supports astrophysical calculations on the rapid neutron-capture process, and extends our knowledge of deformation and nuclear structure. The nuclides of interest are produced by thermal neutron-induced fission of a ^{235}U or ^{249}Cf target inside the research reactor TRIGA Mainz. The extraction and preparation of the nuclides of interest for both experimental branches will be achieved by an aerosol gas-jet based system, a surface or plasma ionizer, and a radiofrequency quadrupole for accumulation and emittance reduction. TRIGA-TRAP and TRIGA-LASER serve as test setups for the MATS (precise Measurements on very short-lived nuclei using an Advanced Trapping System for highly-charged ions) and LaSpec (Laser Spectroscopy on short-lived nuclei) experiments, respectively, at the low-energy branch of the future FAIR facility. The current status of the TRIGA-SPEC facility and recent technical developments improving the efficiency of both branches will be presented.

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