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Status of the MR-ToF MS for JetRIS for laser spectroscopy of heavy actinides at GSI/HIM

The in gas-Jet Resonance Ionization Spectroscopy (JetRIS) apparatus is applied for laser spectroscopy of isotopes in the heavy actinide region to determine their atomic and nuclear properties, at GSI, Darmstadt, Germany. So far, JetRIS utilizes α-decay detection to maximize sensitivity while minimizing the background from unwanted ions. However, for long-lived nuclides ($t_{\frac{1}{2}}$ $gtrapprox$ 10 h) decay-based detection will not be practical. Therefore, a multi-reflection time-of-flight mass separator (MR-ToF MS) will be added to the JetRIS apparatus, allowing for a separation of ions by their mass-to-charge ratios with a high mass-resolving power and efficiency. This will open up the possibility of mass-selective ion detection with low background and will also enable the measurement of non α-decaying species, as well as long-lived and stable isotopes. The MR-ToF MS design is developed within the Darmstadt's MR-ToF (Da's MR-ToF) Collaboration and an overview on the setup and its integration into JetRIS will be given. The status of the comissioning, as well as experimental results and prospects for future measurements will be discussed.

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