Studying the structure of the heaviest elements through laser spectroscopy and mass spectrometry*

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The heaviest nuclei exist thanks to their stabilizing shell structure. This structure is reflected in several nuclear properties that are experimentally accessible. For example, nuclear binding energies obtained via mass measurements display signatures of the shell structure that can be visualized using specific mass filters such as nucleon separation energies. In addition, mass measurements with highest resolution as they can be performed with Penning traps allow us to detect nuclear isomers and to determine their excitation energy. The emergence of isomers, in particular K isomers, is well known in very heavy and superheavy nuclei and contains information on their underlying quasi-particle structure. Laser spectroscopy provides access to several nuclear properties such as the nuclear spin, the magnetic dipole moment, and the electric quadrupole moment via isotope shifts and the hyperfine structure splitting. This also give a handle on nuclear deformation complementary to nuclear spectroscopy. Mass measurements and laser spectroscopy studies have in recent years been extended to the heaviest actinides and beyond thanks to technical and methodological developments [1, 2]. In my contribution I will present an overview of recent measurements studying the nuclear structure around $Z = 100$ and $N = 152$ focusing on the work carried out at the GSI in Darmstadt, Germany using the SHIP separator [3].

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[2] M. Block *et al.*, Radiochimica Acta **107** (2019) 603.
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