Mass, decay and optical spectroscopy of actinide isotopes at IGISOL(Ion Guide Isotope Separation On-Line)

The actinides hold long-standing interest for nuclear physicists, hosting a rich variety of nuclear and atomic phenomena. However, a paucity of nuclear structure information exists above radium, due to material scarcity and the complex atomic structure in actinides. Short-lived isotopes require specialized production techniques combined with highly sensitive detection techniques. A research program is underway using the IGISOL facility, at the Accelerator Laboratory of the University of Jyväskylä (Finland) to study the actinide nuclei using mass measurements, decay spectroscopy and high-resolution optical spectroscopy. To produce the radioactive actinide ion beams, a variety of techniques have been investigated including laser ion sources and accelerator-based production. The successful use of these techniques requires an extensive combination of chemistry, atomic physics, and nuclear physics of which an overview will be presented in this talk.