Introduction into Technical Aspects of ISOL targets

At the ISOLDE facility, the radioactive ion beams (RIBs) are produced in a nuclear reaction between an accelerated proton beam and a stationary target. The produced radioisotopes diffuse out of the target, effuse through the transfer line to the ion source, are electromagnetically mass-separated and distributed to the experimental beam lines.

The production of RIBs is a specialised field. The design of target and ion source units to produce the desired radioisotopes by suitable material selection is of great importance. Furthermore, with the aim of producing pure and intense RIBs, the investigation of ion sources with high chemical selectivity, efficiency and long lifetime are of high priority.

The Target and Ion Source Development (TISD) group is in charge of the development of novel target materials and ion source concepts in order to provide beams that were not accessible previously in sufficient intensities at ISOLDE. This lecture aims to present an overview of the target and ion source units design with focus on the physical processes of isotope production and ionization. Moreover, the future generation of targets, which can withstand high primary beam powers, will be presented.