

ISOLDE RILIS: from proof of principle to a standard versatile technique.

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The high efficiency and selectivity of laser ionization in a hot cavity has been proven at ISOLDE off-line mass separator in 1989. Following the first on-line demonstration of laser-ionized Yb radioactive isotopes at ISOLDE-3, the technique has served for a great number of ISOLDE experiments. Today, the laser ion source named RILIS is one of principal ion sources used at ISOLDE and other ISOL-facilities in the world.

At ISOLDE beams of 26 different elements were produced using high repetition dye lasers. Until 2008 the dye lasers were pumped by copper vapor lasers. Following a plan for upgrade of the laser setup, a new 100W Nd:YAG laser as well as new dye lasers have been installed at RILIS. This resulted in a noticeable improvement in the production of ion beams. In particular, the beam stability increased and higher isotopic yields have been observed.

In 2010 a fully solid state laser system based on 10 kHz repetition rate Ti:Sapphire lasers has been built at CERN to compliment the dye laser system. Its implementation at RILIS is planned for 2011. Due to that the range of elements accessible with RILIS will be extended. A faster switch from one to another element could be achieved using the duo-laser system of RILIS.

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