



Contribution ID: 98

Type: Oral

## Production of radioactive ion beams at ISOLDE with the dual dye and titanium:sapphire RILIS

*Wednesday, 23 May 2012 10:40 (20 minutes)*

The Resonance Ionization Laser Ion Source (RILIS) of the ISOLDE radioactive ion beam facility at CERN has been in operation since 1992 and used for the on-line production of ion beams of 27 different elements. The high efficiency, combined with the inherent selectivity of the multi-step resonance ionization process used is essential for many of the experiments conducted at ISOLDE. For this reason the RILIS is the most commonly used ion source, with a typical annual operating time of more than 2000 hours for on-line physics. Following a recent upgrade of the dye laser system, the reliability and overall performance of the RILIS has increased to a degree where such intense use is reliably sustainable but remains limited by the complexity of switching from one ionization scheme to another. Amongst other benefits, the final stage of the RILIS upgrade: the installation of an independent laser system of Nd:YAG pumped titanium:sapphire (Ti:Sa) lasers, largely addresses this issue. The two laser systems, which each have complementary wavelength tuning ranges can operate in parallel and therefore offer a new set of RILIS operating modes. Depending on the requested elements it is possible to tune one laser system whilst another is in use, use ionization schemes which rely on a mixture of Ti:Sa and dye tuning ranges or use one laser to supplement or backup another. This added flexibility enabled RILIS use for over 2500 hours during the 2011 on-line period, which was the first year of operation of the Ti:Sa system. The specifications of the complete RILIS system will be presented and the various benefits of the dual laser system will be described.

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**Session Classification:** Production and Manipulation of RIB

**Track Classification:** Production and manipulation of RIB