Contribution ID: **75** Type: **oral**

The ISOLDE RILIS laser upgrade program

Tuesday, 8 June 2010 10:20 (20 minutes)

For many ISOLDE users, the isobaric purity of the ion beam is a critical factor. The Resonance Ionization Laser Ion Source (RILIS) is the only ion source capable of achieving high ionization efficiency combined with chemical selectivity for many different elements. By using up to three broadly tunable dye lasers with optional second or third harmonic generation, ionization schemes for 27 elements have been successfully applied for ion beam production. Until 2008, the RILIS relied on copper vapor lasers (CVLs) to pump tunable dye lasers and to ionize highly excited atoms. The maintenance and operation of the CVLs manufactured almost 20 years ago required substantial efforts. A new CERN, KTH (Stockholm) collaboration funded by a grant from the Knut and Alice Wallenberg foundation was established with the goal of improving the RILIS performance through a series of upgrade steps. The first of these, the replacement of the CVLs with a commercial Nd:YAG laser, began in 2008 and by 2009 the new laser was fully integrated into the RILIS setup and the CVLs were no longer required. An improvement in RILIS performance in terms of ionization efficiency, as well as overall stability and reliability has been achieved. The second phase of the RILIS upgrade is underway and involves the replacement of the dye lasers. The three new dye lasers are adapted to take advantage of the availability of a 355 nm output of the Nd:YAG pump laser, extending the fundamental tuning range into the blue part of the spectrum to bridge the gap in the spectral coverage offered by the dye laser fundamental and second harmonic beams of the 532 nm pumped system. One laser has a motorized intra-cavity etalon which reduces its linewidth to 1 GHz. This is necessary for precision tuning to hyperfine components of an electron energy level to perform an isomer separation with RILIS, or for high resolution scanning during in-source resonance ionization spectroscopy studies. The third RILIS upgrade task is the installation of a complementary, all solid state RILIS system of Nd:YAG pumped Titanium Sapphire lasers, alongside the existing setup. The construction of this system, which is being carried out in collaboration with the University of Mainz, began in 2009 and its progressive installation during 2010/2011 is planned.

Is this an invited talk? (please answer yes or no)

No

Would you prefer your contribution to be a poster presentation? (please answer yes or no)

no

Would you prefer your contribution to be an oral presentation? (please answer yes or no)

yes

Are you a student, postdoc or an attendee from an "emerging"country and would like to apply for financial support?

No

Primary author: MARSH, Bruce (CERN)

Co-authors: FEDOROV, Dima (PNPI, Gatchina); WENDT, Klaus (University of Mainz); BERG, Lars-Erik (KTH, Stockholm); SJODIN, Marica (CERN); SELIVERSTOV, Maxim (Instituut voor Kern- en Stralingsfysica, Leuven); LOSITO, Roberto (CERN); ROTHE, Sebastian (University of Mainz); FEDOSSEEV, Valentin (CERN)

Presenter: MARSH, Bruce (CERN)

Session Classification: Production and Manipulation of RIB

Track Classification: Production and manipulation of RIB