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Laser Ion Source Developments for Radioactive Ion Beams. RUOHONG LI, JENS LASSEN, JEAN PHILIPPE LAVOIE, ANDREA TEIGELHOEFER, PIERRE BRICAULT, JENS MEISSNER, TRIUMF Vancouver BC V6T 2A3 Canada, RADIOACTIVE ION BEAM DEVELOPMENT GROUP TEAM — The Resonant Ionization Laser Ion Source is a versatile and efficient tool to generate radioactive ion beams at on-line mass separator facilities. Due to its high ionization efficiency and elemental selectivity it allows to delivery, in principle, isobar free, clean radioactive ion beams (RIB). Parallel to the on-line laser ion source at TRIUMF's Isotope Separator and Accelerator facility, an off-line laser ion source test stand has been built for systematic laser resonance ionization spectroscopy and the development of ionization schemes. Three Ti:Sa lasers operating at 10 kHz repetition rate, with the option of harmonic frequency generation (doubling, tripling or quadrupling) are used to resonantly step-wise ionize the element of the interest. For systematic spectroscopic studies a grating tuned Ti:Sa laser is available that allows a continuous scan range up to 100 nm. With this laser inventory and the test stand Rydberg series and auto-ionizing levels can systematically be studied. Since August 2009 we have commissioned the system and studied Ga, Al and Ca with the new off-line system. The development of efficient laser resonant ionization schemes, their investigation and comparison using the laser ion source test stand and the all solid-state laser system will be discussed.

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