

## LIST developments at IGISOL

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The development work of a laser ion source (FURIOS) at IGISOL was started in 2004 [1]. The aims of this project are to improve the ion guide efficiency and achieve chemical selectivity that is not naturally inherent in the ion guide technique. These aims can be realized using the LIST method, which was originally proposed to improve the quality of the ion beam from a hot cavity laser ion source [2]. In the LIST method the neutral atoms are allowed to exit the ion guide within the gas flow. Atoms are selectively ionized with co-propagating lasers, captured and guided towards the mass separator using an RF- sextupole (SPIG) system [3]. By repelling any non-neutral fraction at the entrance to the SPIG the highest selectivity can be achieved as any ion accelerated toward the mass separator is a resonant ion. The first off-line LIST tests were successfully completed in January 2006 on stable bismuth.

When the repelling field is changed to an accelerating field at the entrance to the SPIG, it can be operated in an ion transporting (IT) mode. This mode has several advantages compared with the classical skimmer electrode. An increased efficiency, easier installation, a capability to handle larger amounts of ions, a higher mass resolving power after the dipole magnet, the possibility to use higher gas pressures in the ion guide and a good stability all make the SPIG a preferable choice. The off-line and on-line tests performed thus far show a factor of 3-5 increase in efficiency as compared to a classical skimmer electrode

Results of the LIST test will be presented, and on-line yields comparing the new sextupole with the standard skimmer will be highlighted.

[1] I. D. Moore et al., J. Phys. G 31 (2005) S1499.

[2] K. Blaum et al., Nucl. Instr. and Meth. B 204 (2003) 331.

[3] H. J. Xu et al., Nucl. Instr. and Meth. A 333 (1993) 274.