

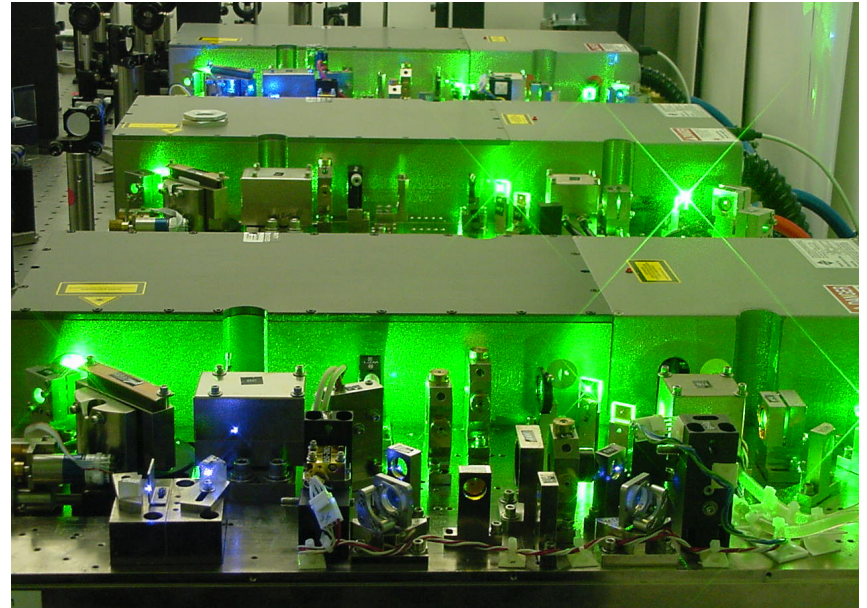
Pure radioactive Ga ion beams provided by new laser ion source for nuclear research at ORNL

- A highly-selective laser ion source based on multi-step resonant photo-ionization has been successfully commissioned at ORNL.
- The laser ion source is used to effectively suppress isobaric contamination and provide pure beams of radioactive nuclei far from stability.
- Beams of neutron-rich Ga isotopes were delivered to the Low-energy Radioactive Ion Beam Spectroscopy Station (LeRIBSS) with previously unattainable purity and intensity.
- The β -decay of the very exotic isotope ^{86}Ga , delivered to LeRIBSS at the rate of several ions per second, was studied for the first time. The observation of only a few atoms of ^{86}Ga was reported earlier in fragmentation studies.
- The laser ion source can extend the purity, intensity, and range of short-lived radioactive species available for research at ORNL.

Contact: Yuan Liu, 865-574-4761, liuy@ornl.gov

Funding sources: DOE Office of Science, Office of Nuclear Physics

Resources: Holifield Radioactive Beam Facility, ORNL



The laser system for the laser ion source consists of three tunable Ti:Sapphire lasers with 2nd, 3rd, and 4th harmonic generation capability. It can provide up to three-step, three-photon resonant ionization of atomic species. Ionization schemes for more than 30 elements in the Periodic Table have been developed. In studies with stable isotopes, up to 40% ionization efficiency – the highest laser ion source efficiency to date for stable isotopes – has been achieved for selected elements.