



Contribution ID: 1933 Contribution code: MOPR69

Type: **Poster Presentation**

## Highly charged magnesium ion production using laser ablation ion source at Brookhaven National Laboratory

*Monday, 20 May 2024 16:00 (2 hours)*

We are researching the development of an ultra-high intensity heavy ion source based on laser ablation ion source (LIS) technology coupled with a unique beam injection technique called Direct Plasma Injection Scheme (DPIS). A metallic target is ablated using a Q-switched Nd:YAG laser to generate a pulsed high-density plasma, which is then injected and accelerated by a radio-frequency quadrupole (RFQ) linear accelerator. The ion source enables the production of rare isotopes, the use of particle beams in cancer treatment, and nuclear physics experiments. The exploration of multiple charge states for Mg production is currently underway. The measurement of beam current is conducted using a Faraday cup positioned at the end of the beam line. Following the RFQ acceleration, the beam is transported by multiple quadrupole magnets and a steerer, and a dipole magnet then directs the beamline into the Faraday cup. Notably, we have accomplished an ion beam current of about 20 mA for Mg<sup>10+</sup> ions and a current exceeding 10 mA for fully stripped Mg<sup>12+</sup> ions. In this presentation, I will discuss the operation of the LIS at Brookhaven National Laboratory (BNL) and the outcomes of Mg ion production.

### Footnotes

### Funding Agency

### Paper preparation format

LaTeX

### Region represented

North America

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**Session Classification:** Monday Poster Session

**Track Classification:** MC3: Novel Particle Sources and Acceleration Techniques: MC3.T01 Proton and Ion Sources