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Current Status of Laser Ion Source Development at RAON

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The Resonance Ionization Laser Ion Source (RILIS) has become the most-used ion source type in the ISOL (Isotope Separator On-Line) facilities worldwide due to its element selectivity and high ionization efficiency. The hot-cavity type RILIS developed at RAON is based on resonant excitation of atomic transitions by the frequency tuned laser beams which are overlapped temporally and spatially and transported to the 3 mm aperture of the hot-cavity The RILIS laser system consists of 4 Ti:sapphire lasers (High Rep. Ti:Sapphire Laser, Radiant Dyes Laser Accessories GmbH) pumped by a Nd:YAG laser (LDP series, Lee Laser Inc.) at 10 kHz repetition rate. An additional Nd:YAG laser (Talon HE GR1000, Spectra-Physics Inc.) of 10 W with 10 kHz is also fitted up for off-resonance ionization scheme. For the laser ionization scheme study, the RAON RILIS has been already tested with stable Sn isotopes in the off-line test facility, demonstrating the improved ionization efficiency [1,2].
In this presentation, we will report on both stable and RI beam studies of Mg isotopes, which are currently underway for the development of the resonance ionization laser ion source at the ISOL facility of IRIS.

[1] S. J. Park et al., Nuclear Inst. And Methods in Physics Research B 414, 79 (2018)
[2] S. J. Park et al., Journal of the Korean Physical Society, DOI : 10.1007/s40042-024-01208-2 (2024)

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