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## Status of the laser manipulations of H- beam at J-PARC

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The laser manipulations of H- ion beam by single or double neutralization is a very promising technique and highly essential to utilized in accelerator processes such as stripping, pulse chopping, collimation, extraction, and beam diagnostics for the present and future high-intensity proton accelerators. At J-PARC, we are preparing for a POP (Proof-of-Principle) demonstration 400 MeV H- stripping by using only lasers. A prototype YAG laser system and a laser cavity system to reduce the laser power are being developed through 3 MeV H- neutralization studies. Fermilab utilizes H- neutralization at 0.75 MeV by establishing a laser Notcher system for a gap in the H- pulse needed for a clean beam extraction from the ring. To minimize the laser power and maximize the interaction efficiency are common issue at both laboratories. Under the US-Japan collaboration for high-intensity neutrino beam, we are closely working to establish recycling/reusing of seed laser pulses to reduce a size of the laser system. In parallel, we have also developed non-destructive beam diagnostic systems at lower H- energy of 3 MeV, which will be implemented to the 400 MeV as well as easily applicable to the Fermilab linac including PIP-II linac. Installation of the laser system at J-PARC linac for 400 MeV H- stripping is ongoing to start the POP experimental study in 2023.

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### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

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