Laser Interlock System and its Safety at MUSE / J-PARC

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Safety is one of the most important things for our study. We will report on the laser interlock system, and related utilities for laser safety at MUSE / J-PARC. For Ultra Slow Muon production at U-line / MUSE / J-PARC, coherent light (122.09-nm and 355-nm light) will ionize thermal muoniums (μ^+e^-) resonantly [1]. This coherent 122.09-nm (vacuum ultraviolet) light is generated in a krypton gas cell by sum-difference frequency mixing of 212.55-nm light and tunable 820.65-nm light. These coherent pulse sources based on a diode-pumped fiber laser and solid-state laser technologies had been developed at RIKEN [2], and they were installed in a laser cabin. There intense coherent light are classified into classe-4 laser. Desired value is 50-100 mJ /pulse @ 212.55 nm, 50-100 mJ @ 820.65 nm, 20-50 mJ /pulse @ 355 nm, respectively.

Laser safety is taken into account at laser cabin and U1 shielding area. U1 area contains the Mu production chamber [1] and transport system of laser pulses [3]. We have prepared the laser interlock system with shutters. For each light, the shutter chamber has slow and fast shutters and beam stops with Brewster window. For each place, safety glasses with appropriate optical density are prepared. At the laser cabin (clean room), protective enclosures have limit switches for interlock. A door of air shower has a personal identification number code lock. At U1 area, protective housings (clean booth) and view ports for vacuum chamber have also limit switches.

References

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