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Development of a muon linac for the J-PARC Muon $g-2$ /EDM experiment

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At J-PARC, a muon linac is being developed for future muon $g - 2$ /EDM experiments. The muon linac starts with an ultra-slow muon (USM) source that generates muons with an extremely small momentum of 3 keV/c (kinetic energy $W=25$ meV) by laser ionization of thermal muonium. The generated USM accelerated to 5.6 keV by an electrostatic field and injected into a radio frequency quadrupole (RFQ). The injected muons are accelerated to 0.34 MeV by the 324-MHz RFQ. Then, the energy of the muon beam is boosted to 4.5 MeV with a 324-MHz interdigital H-type drift tube linac (IH-DTL). Following the IH-DTL, 1296-MHz disk-and-washer (DAW) structures accelerate the muon up to 40 MeV. Finally, the muons are accelerated from 40 MeV to 212 MeV using a 2592-MHz disk-loaded traveling wave structure (DLS). In this presentation, details of the linac design and the recent progress toward the realization of the world's first muon linac will be presented.

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