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## Optimization of the High-Repetition-Rate Pulsed Electron-Driven Muon Beamline based on SHINE Facility

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The Shanghai SHINE facility is in the throes of construction at the Zhangjiang Science Park in Shanghai. This state-of-the-art facility is poised to generate a pulsed electron beam with an energy of 8 GeV, a charge of 100 pC, and the potential to achieve a maximum repetition rate of 1 MHz. Marking a departure from traditional proton-driven muon sources, our approach involves the use of a magnetic kicker to select the electron beam bunches at the desired repetition rate of 50-100 kHz for a muon beamline. This frequency is aligned with the requirements of  $\mu$ SR experiments where the measurement time is ranging from 10 to 20  $\mu$ s. Our poster presents a comprehensive overview of the target optimization process for an 8 GeV incident electron beam, alongside the development of a large-aperture solenoid-based surface muon beamline. Simulations indicate that the refined beamline is capable of delivering between  $10^6$  to  $10^7$  surface muons per second at the final focus, achieving a total transmission efficiency of about 9 % at the final beam spot area of 100 mm diameter.

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