

Abstract Submitted
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Third-integer Resonant Slow Extraction from the Delivery Ring at Fermilab¹ AAKAASH NARAYANAN, Northern Illinois Univ, VLADIMIR NAGASLAEV, Fermi National Accelerator Laboratory, MICHAEL SYPHERS², Northern Illinois Univ — A third-integer resonant slow extraction system is being developed for Fermilab's Delivery Ring (DR) to send protons to the muon production target for the Mu2e experiment. Using bunched beam in the DR, pulses of protons separated by $1.6 \mu\text{s}$ (revolution frequency) for a total spill duration of 43 ms provides the proper time structure and required spill intensity of about 3×10^7 protons per pulse. The third-integer resonance is to be achieved using six sextupoles, in conjunction with fast quadrupole magnets to drive the horizontal tune of the DR very close to $29/3$. Additionally, a Radio Frequency Knock-out (RFKO) method could be employed to heat up the beam for a finer control of the spill rate. In this talk, the scope of accelerator physics and the challenges of the extraction process from the DR will be briefly reviewed. A preliminary computational analysis of the extraction process shall be discussed, which will include extraction efficiency, spill rate, possible tune-ramp achievable using quads, application of RFKO to heat the beam, the feedback system to regulate the spill rate by choreographing both RFKO and quad tune ramp, and other factors concerning the overall control of the beam.

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