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Discrimination of Rare π^+ and μ^+ Decays at Rest Using Artificial Neural Networks EMIL FRLEŽ, University of Virginia, PEN COLLABORATION — PEN, a new experiment aiming to measure the $\pi^+ \to e^+\nu$ decay branching ratio (π_{e2}) with a relative uncertainty of $\sim 5 \cdot 10^{-4}$ is being mounted at the Paul Scherrer Institute ring accelerator. The PIBETA detector was upgraded with new active degrader and fast active target detectors. Low-momentum π^+ beam tunes in the range 72-80 MeV/c were developed producing stopping rates of up to 20k π^+/s. Beam detector PMT waveforms were recorded with a 2 GHz/10 bit Acqiris digitizer. The "system waveform functions" for the stopping π^+'s and μ^+'s and decaying e^+'s were determined from a set of clean Michel events. The $\pi^+ \to e^+\nu$ events were distinguished from the copious Michel background using artificial neural network analysis.

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