Maximum Likelihood Analysis for the PEN Experiment AN-
THONY PALLADINO, University of Virginia, PEN COLLABORATION — The
experimental determination of the $\pi^+ \to e^+\nu$ (π_{e2} decay) branching ratio is one of
the best tests of lepton universality. The PEN experiment at PSI aims to measure
this branching ratio with an order of magnitude improvement in the uncertainty,
reaching $\Delta B/B \leq 5 \times 10^{-4}$. The final branching ratio will be calculated using
a maximum likelihood analysis and the Feldman-Cousins approach for calculating
confidence limits. This analysis assigns each event to its most likely process ($\pi^+ \to e^+\nu$, $\pi^+ \to \mu^+\nu$, decay-in-flight, pile-up, etc.) using Monte Carlo verified probability
distribution functions of our observables (energies, times, and target waveform pulse-
shape analysis results). The current state of our preliminary maximum likelihood
analysis will be presented.

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