Beam Test Ecal PID

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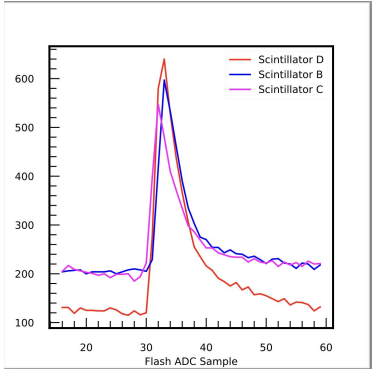
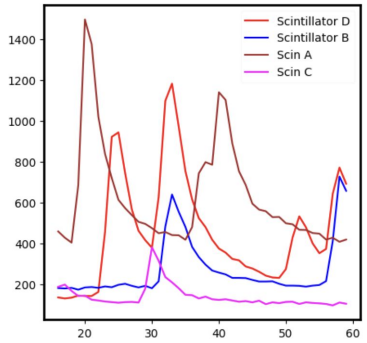
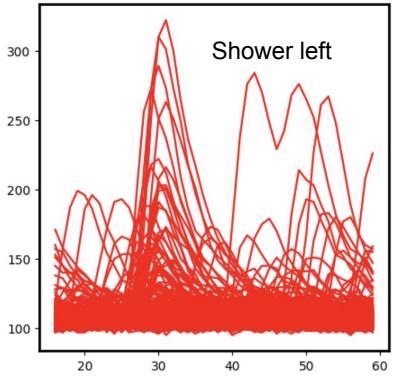
- **e^- Efficiency:**
  - Not possible without momentum selection
  - Dominated by low energy background
- **$\pi^{+/-}$ Rejection:**
  - Comparison with SoLID simulation
  - Comparison with SoLID pre-CDR



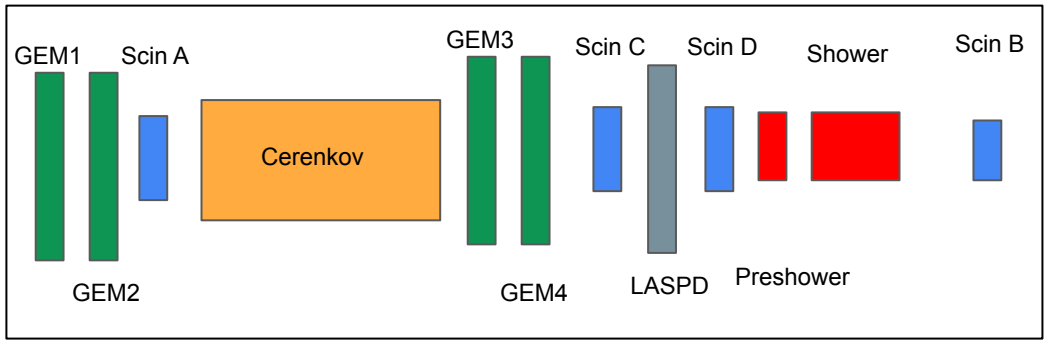


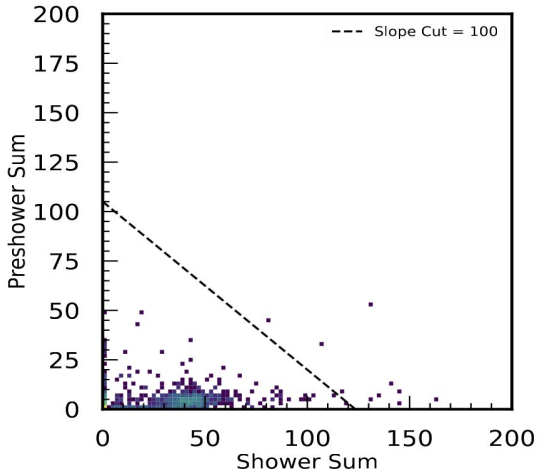
$\pi^{+/-}$ Rejection

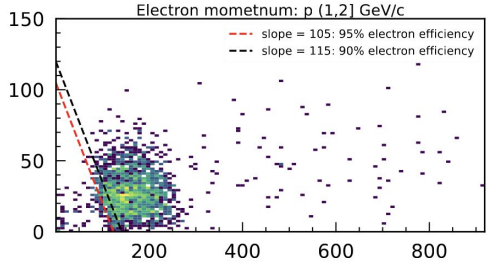


- Two methods
  - Use integrated quantities and standard Cherenkov cut -online
  - Use pulse information in trigger (and other scintillators)-offline

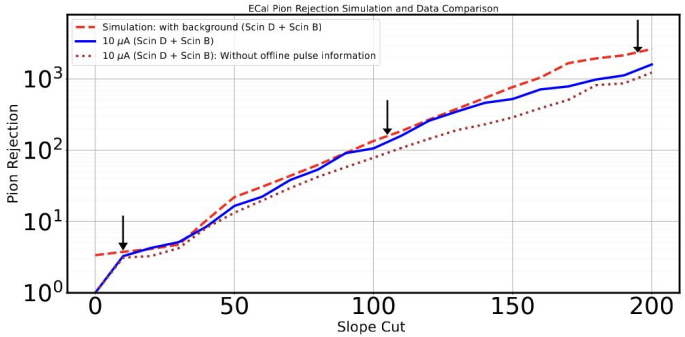
- Trigger
  - TS2 (Sc-D && Sc-B)
- Currents
  - 10, 20 & 45 uA
  - Limited number of runs with varying currents, in which the trigger does not include Shower
- Cuts
  - Cherenkov ==0
  - Scin C and LASPD for traditional method
- Apply slope cut on Shower Sum vs Preshower Sum
- Also, use simulation to determine:
  - $\pi^{+/-}$ rejection
  - e^{-} efficiency - how are low momentum e^{-} affected

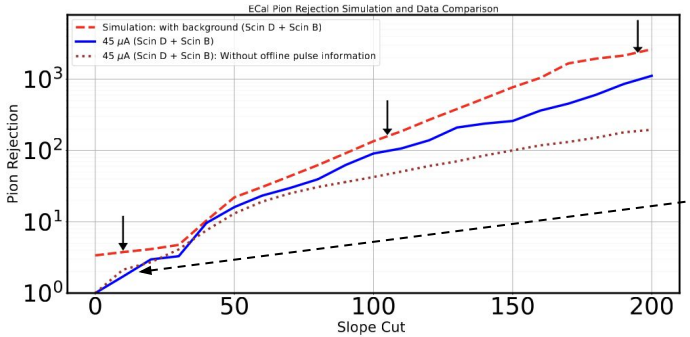




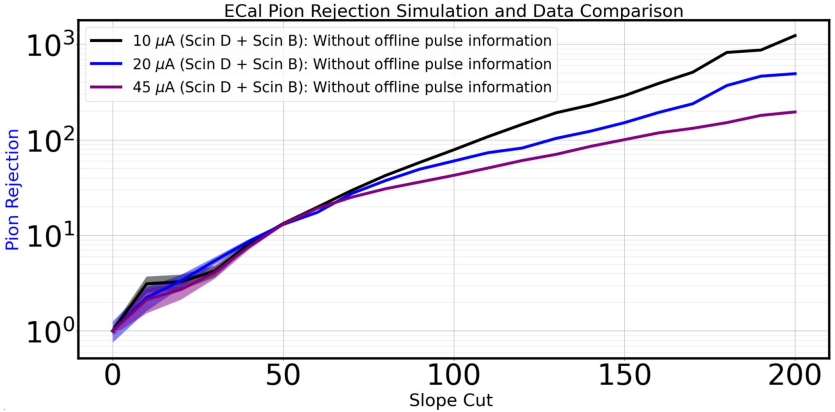


Comparison of online vs offline





Comparison of online for different beam currents



Arrows correspond to 95% electron efficiency for electrons with momentum:
(0,1] GeV/c
(1,2]
(2,3]

$\pi^{+/-}$ rejection from offline is more uniform
10 μA, slope cut of 100 ~ 100:1

Rate Dependence

- $\pi^{+/-}$ Rejection slope cuts (100, 200)
- Fit with a log-linear function
- Extrapolate to 3x and 5x of 45 uA (approximately the radiation level of shower and preshower with SoLID)