October campaign: Single-particle simulation and SciGlass Barrel ECal

Renee Fatemi, Dmitry Kalinkin

University of Kentucky





October campaign

- » Particle species are e^- and π^-
- » p_{thrown} = 100 MeV, 200 MeV, 500 MeV, 1 GeV, 2 GeV, 5 GeV, 10 GeV, 20 GeV
- » Three polar angle ranges: $3 50^{\circ}$, $45 135^{\circ}$ and $130 177^{\circ}$
- » Reconstruction with Gaudi+Juggler (Athena) and with JANA2+ElCrecon (ePIC)
- » Two ePIC detector configurations "Arches" and "Bruce Canyon" with geometry tag 22.10.0
- » Certain combinations of energies and angles are currently missing Reported on Mattermost

Re-run with 22.11.0 in progress



E/p for electrons





Resolution and energy efficiency





Electron/pion discrimination at 100MeV

EcalBarrelSciGlassRecHits, 100MeV EcalBarrelSciGlassRecHits, 100MeV 100 e – pi — 10^{6} -True positive rate, % (Electron identified as electron) E_{dep} > 0.09 80 -60 -40 -20 - 10^{5} -0 -0 -0.6 0.8 1.0 20 40 60 80 0.0 0.2 0.4 100 False positive rate, % Edep. /pthrown (Pion identified as electron)

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Electron/pion discrimination at 200MeV

EcalBarrelSciGlassRecHits, 200MeV EcalBarrelSciGlassRecHits, 200MeV 100 pi — True positive rate, % (Electron identified as electron) Edep. > 0.0880 -60 - 10^{5} -40 -20 - 10^{4} 0 -0 0.2 0.4 0.8 20 40 60 80 0.0 0.6 1.0 100 False positive rate, % Edep. /pthrown (Pion identified as electron)



Electron/pion discrimination at 500MeV

EcalBarrelSciGlassRecHits, 500MeV EcalBarrelSciGlassRecHits, 500MeV 100 pi — True positive rate, % (Electron identified as electron) 80 -Edep > 0.67 Othrown . 60 -105 -40 -20 -0 _ 0 -0.2 0.4 0.6 0.8 1.0 20 40 60 80 0.0 0 100 False positive rate, % $E_{dep.}/p_{thrown}$ (Pion identified as electron)

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Electron/pion discrimination at 1GeV

EcalBarrelSciGlassRecHits, 1GeV EcalBarrelSciGlassRecHits, 1GeV 100 -Edep. > 0.70pi — True positive rate, % (Electron identified as electron) 80 -60 -40 -105 -20 -0 -0 -0.2 0.4 0.6 0.8 1.0 20 40 60 80 0.0 0 100 False positive rate, % $E_{dep.}/p_{thrown}$ (Pion identified as electron)



Electron/pion discrimination at 2GeV



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Electron/pion discrimination at 5GeV





Electron/pion discrimination at 10GeV





Electron/pion discrimination at 20GeV





Pion rejection factors



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