

Cluster center determination in barrel ECAL

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coordinates in barrel ECAL: Z and φ (azimuthal angle)

Barrel: L=552cm, R=174.8cm, modules in Z - 138 in φ - 336

Old geometry

standard method

$Z(\varphi)(\text{average}) = \Sigma(z(\varphi)(i) * w(i)) / w$, where $w = E(\text{total})$, $w(i) = E(i)$
and $E(\text{total})$ – total energy in cluster, $z(\varphi)(i)$ – coordinates
of the cell in cluster, $E(i)$ – energy in the cell

our proposal

value: $a(i) = \max(0.0, (\eta + \log(z(\varphi)(i) / E(\text{total})))$

calculates for each cell in the cluster

$z(\varphi)(i)$ – coordinates of the cell in cluster,

η – parameter

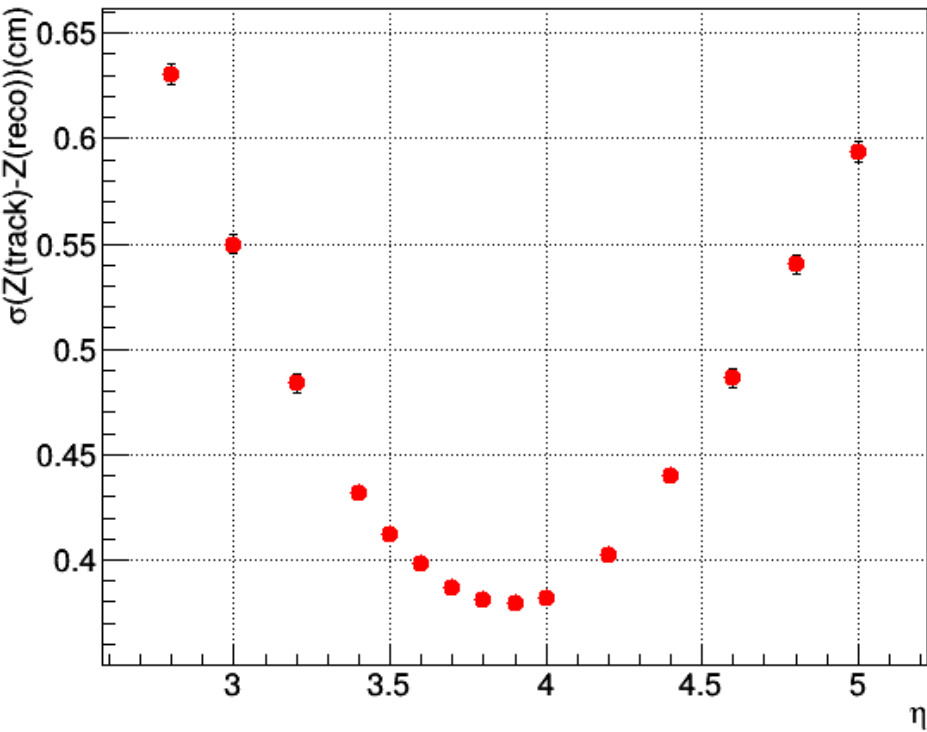
$E(\text{total})$ – total energy in cluster

$w = \Sigma a(i)$

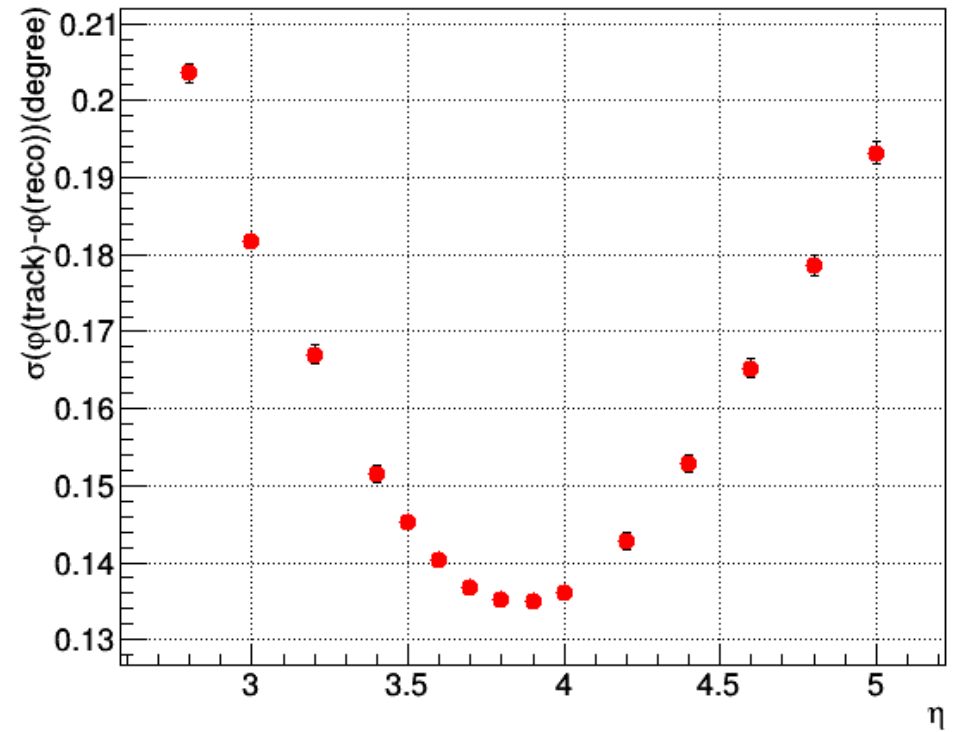
$Z(\varphi)(\text{center}) = \Sigma(z(\varphi)(i) * a(i)) / w$

Particle for scan: electron with $E=2\text{Gev}$ perpendicular to Z axis without magnetic field
resolution of Z and φ versus parameter η

Energy 2 Gev no magnetic field

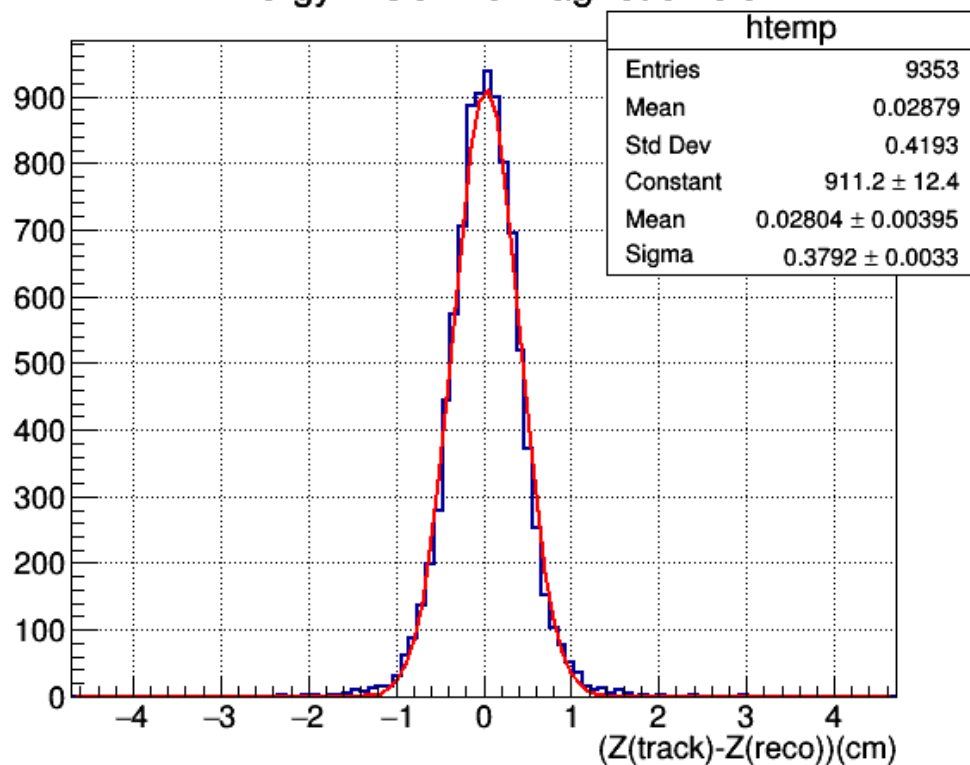


Energy 2 Gev no magnetic field

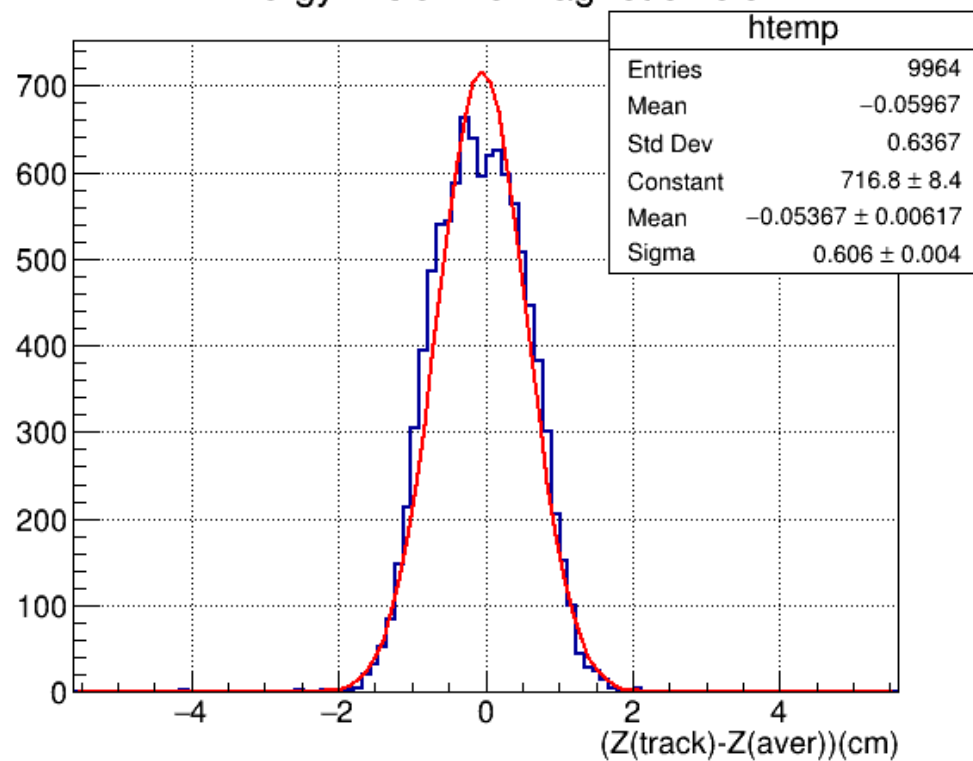


comparison $Z(\text{reco})$ and $Z(\text{average})$ $\eta = 3.9$ optimal value for this case

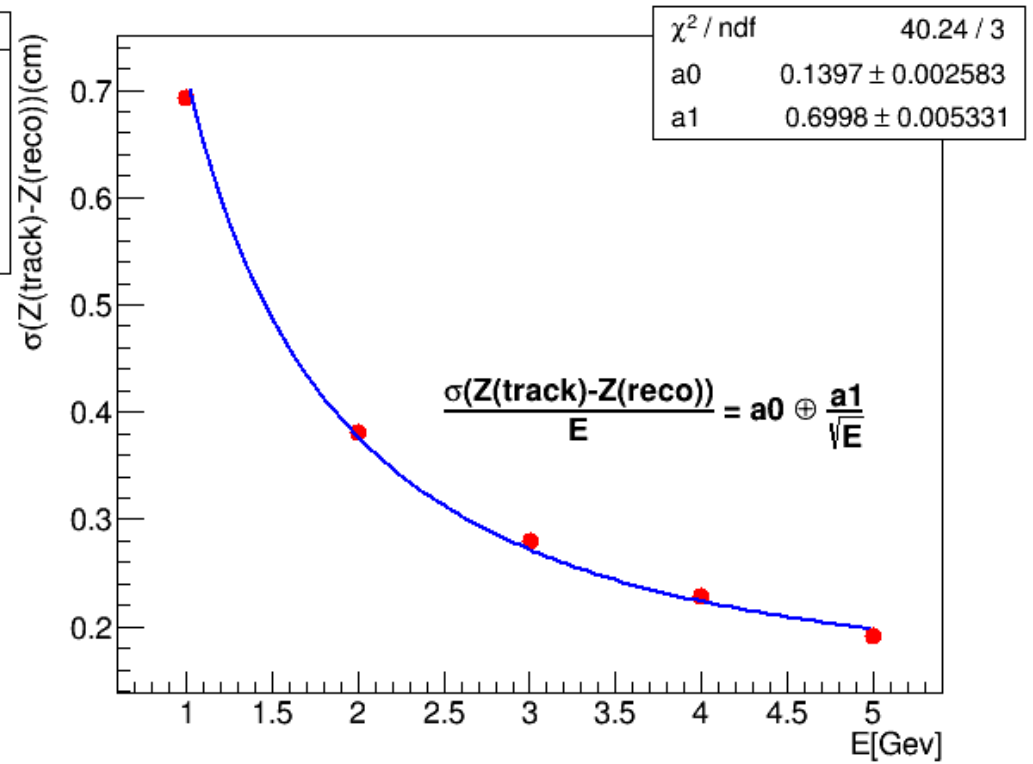
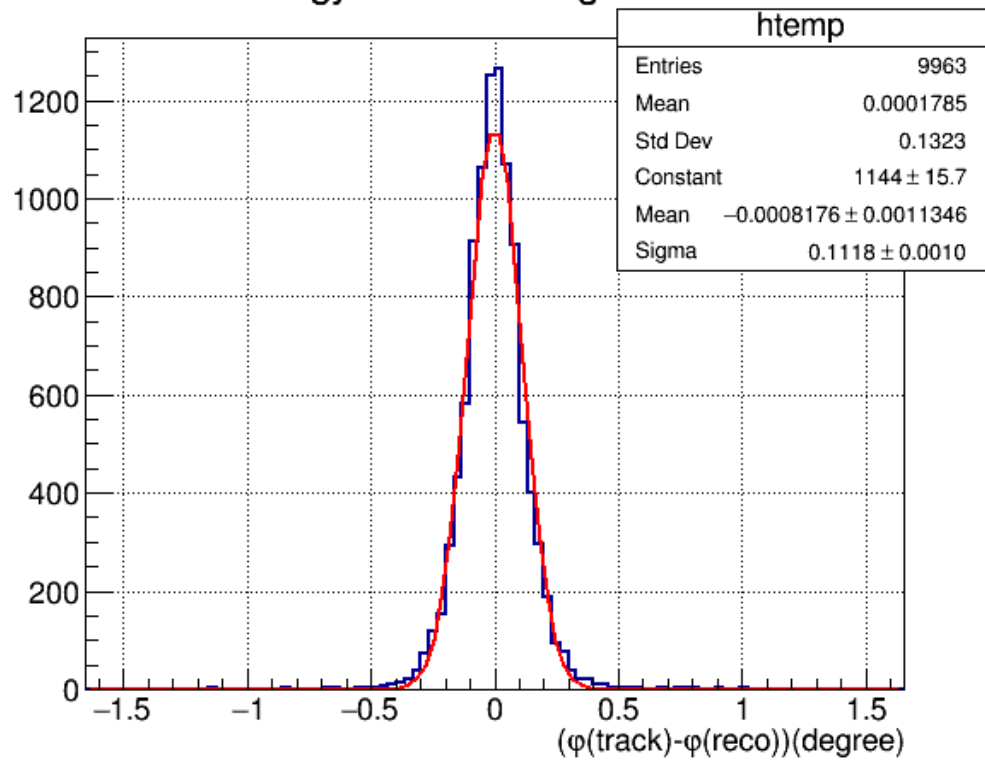
Energy 2 Gev no magnetic field



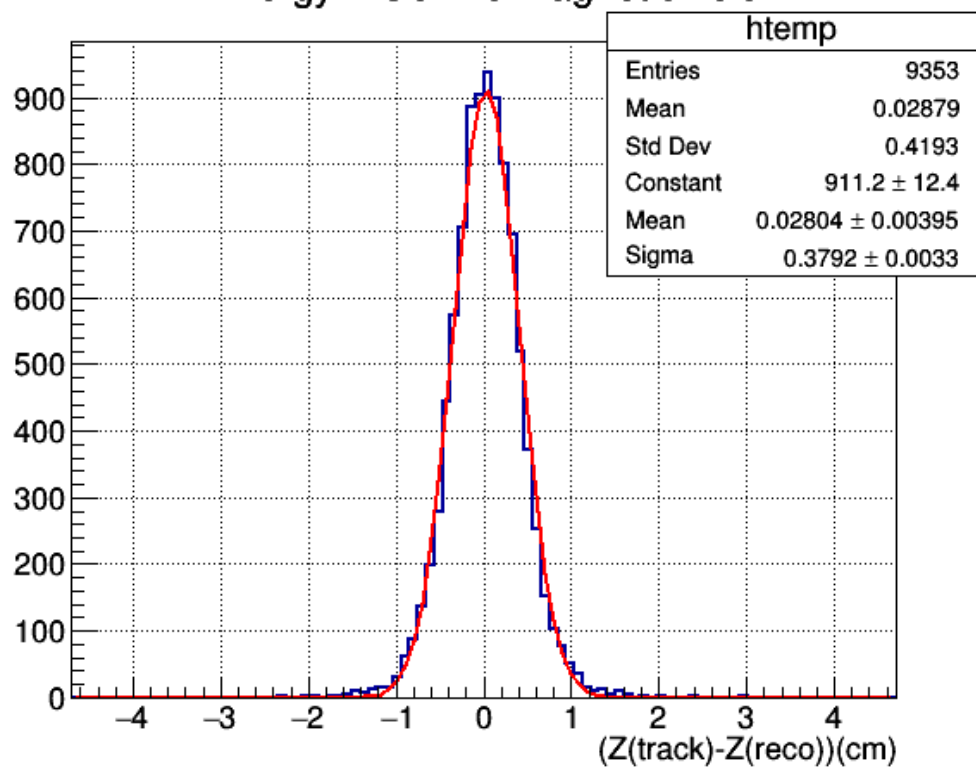
Energy 2 Gev no magnetic field



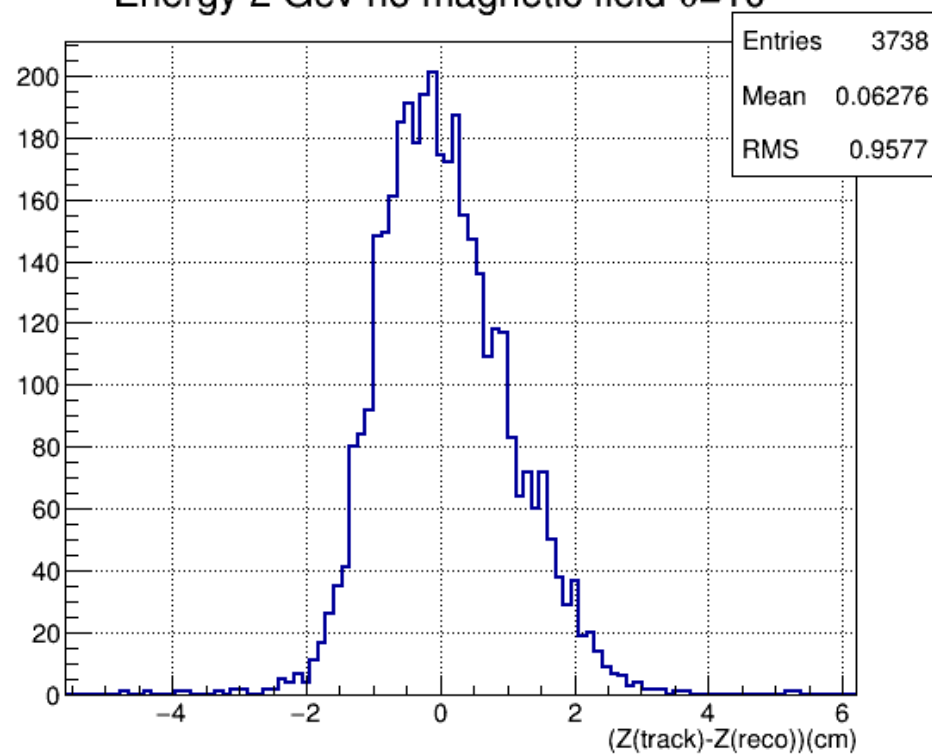
Energy 2 Gev no magnetic field



Energy 2 Gev no magnetic field

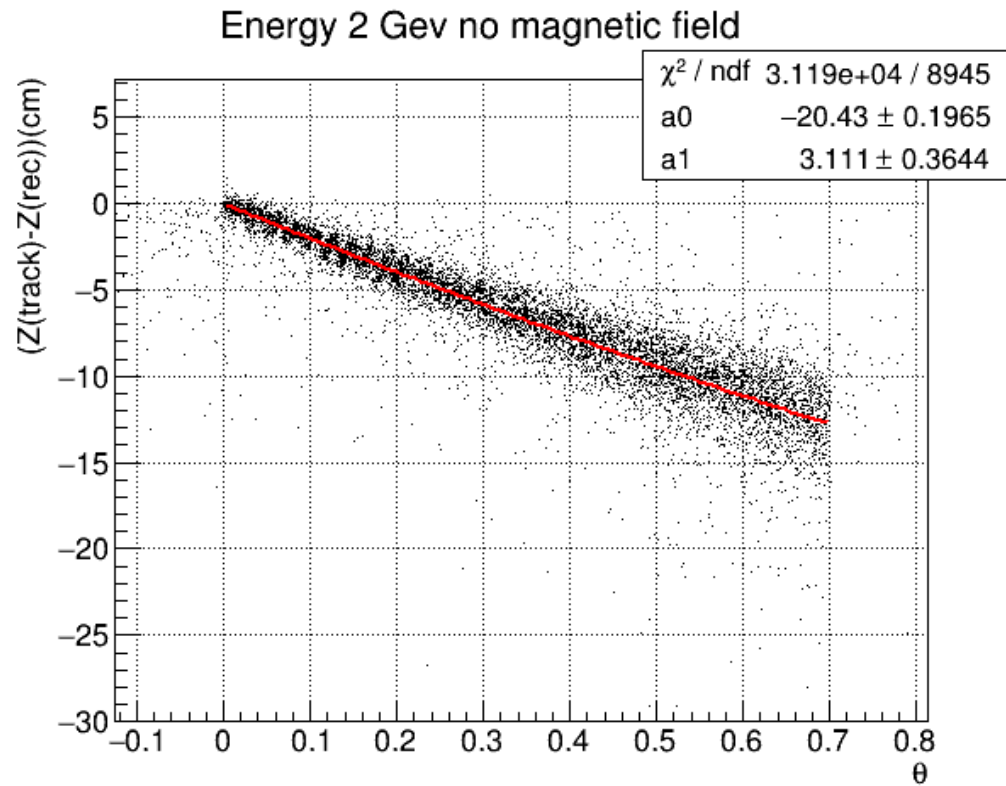


Energy 2 Gev no magnetic field $\theta=10^0$

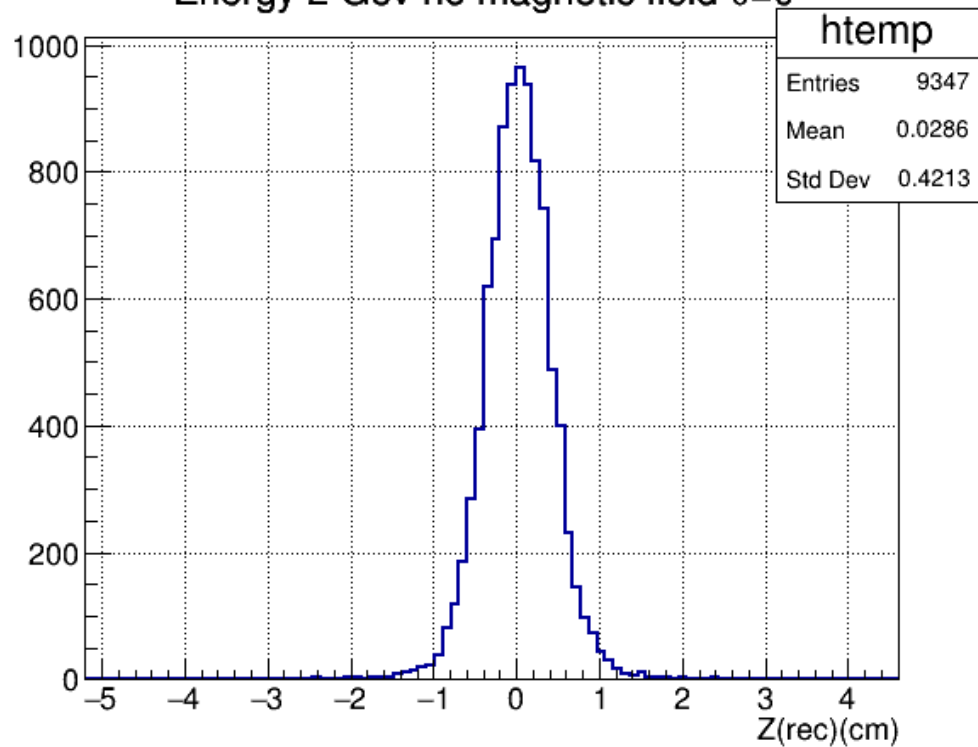


Backup

scan with electron 2Gev without magnetic field, varied θ (angle between impulse and x-y plane) from 0° 40°



Energy 2 Gev no magnetic field $\theta=0^0$



Energy 2 Gev no magnetic field $\theta=40^0$

