

Search for time-dependent fluctuations in cosmic ray flux observed with AMS01 detector

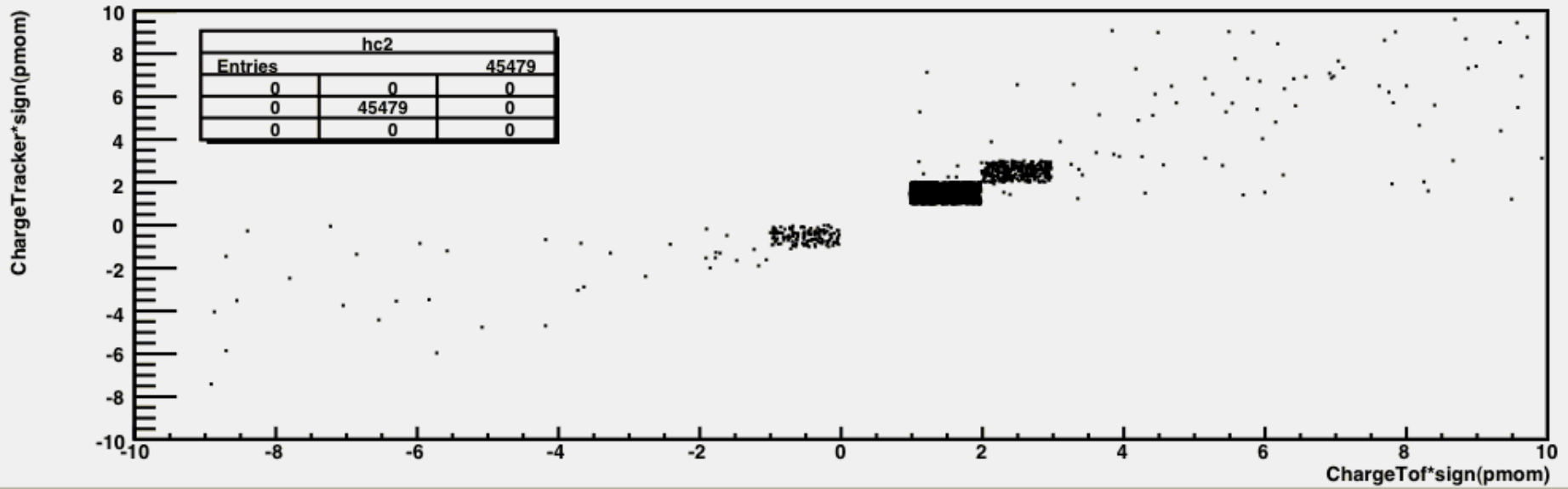
- Construct spectra for electrons, protons and helium nuclei
- First need to identify particles
(i.e. select real events)

PRESELECTION

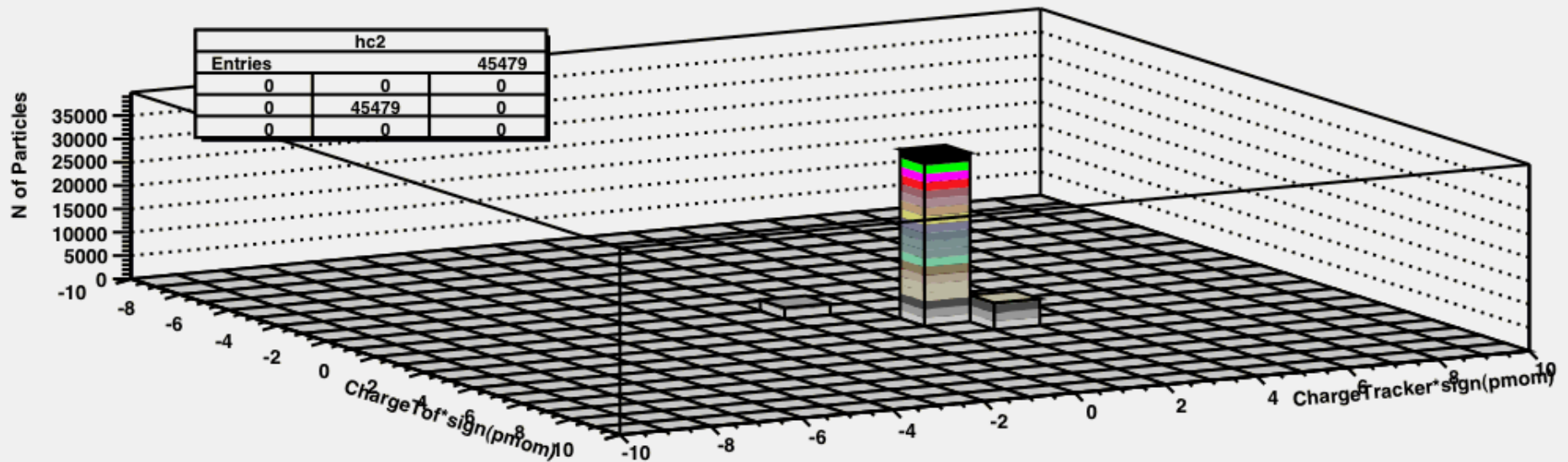
- ♦ No hits in Anticoincidence counter
- ♦ At least one reconstructed track
- ♦ At least one charge measurement
- ♦ At least one β measurement
- ♦ One reconstructed particle

ChargeTOF vs ChargeTracker:

ChargeTof vs ChargeTracker



ChargeTof vs ChargeTracker



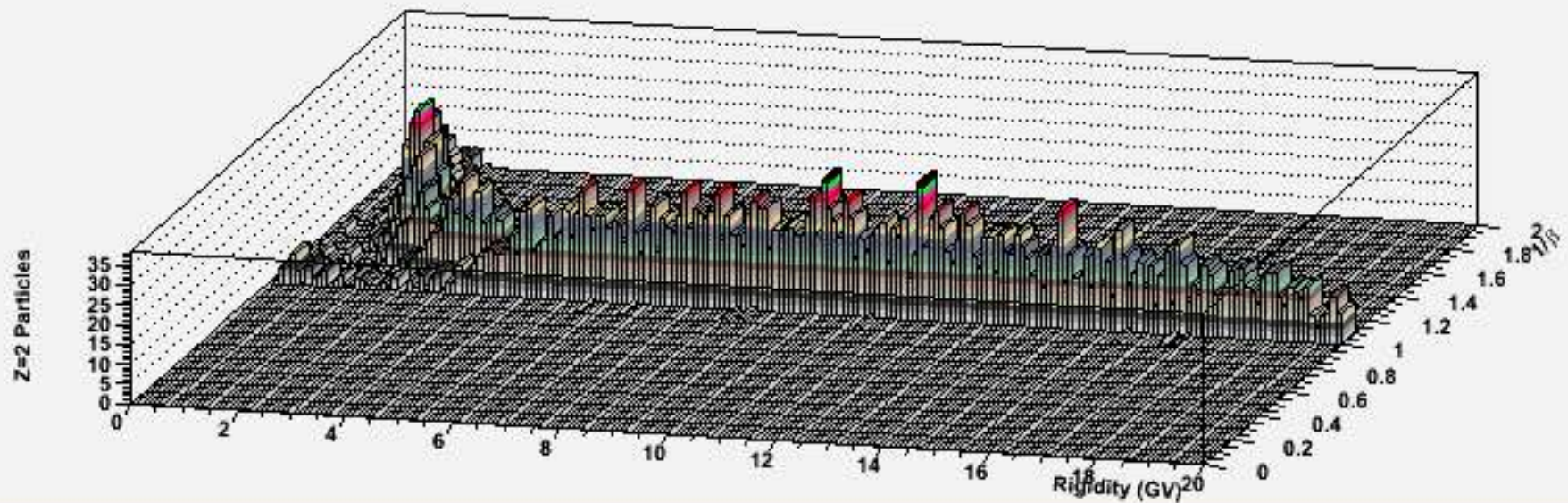
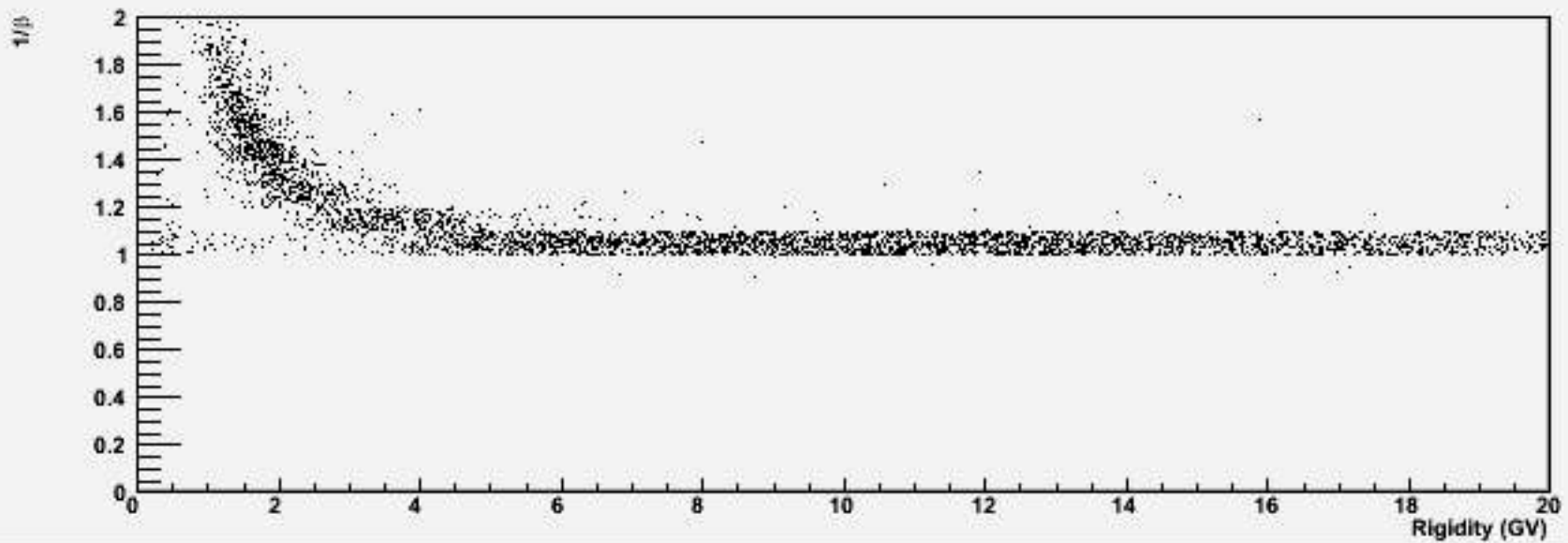
Further selection: $\text{ChargeTOF} == \text{ChargeTracker}$

Electron candidates: $\text{charge} * \text{sign}(\text{Pmom}) = -1$

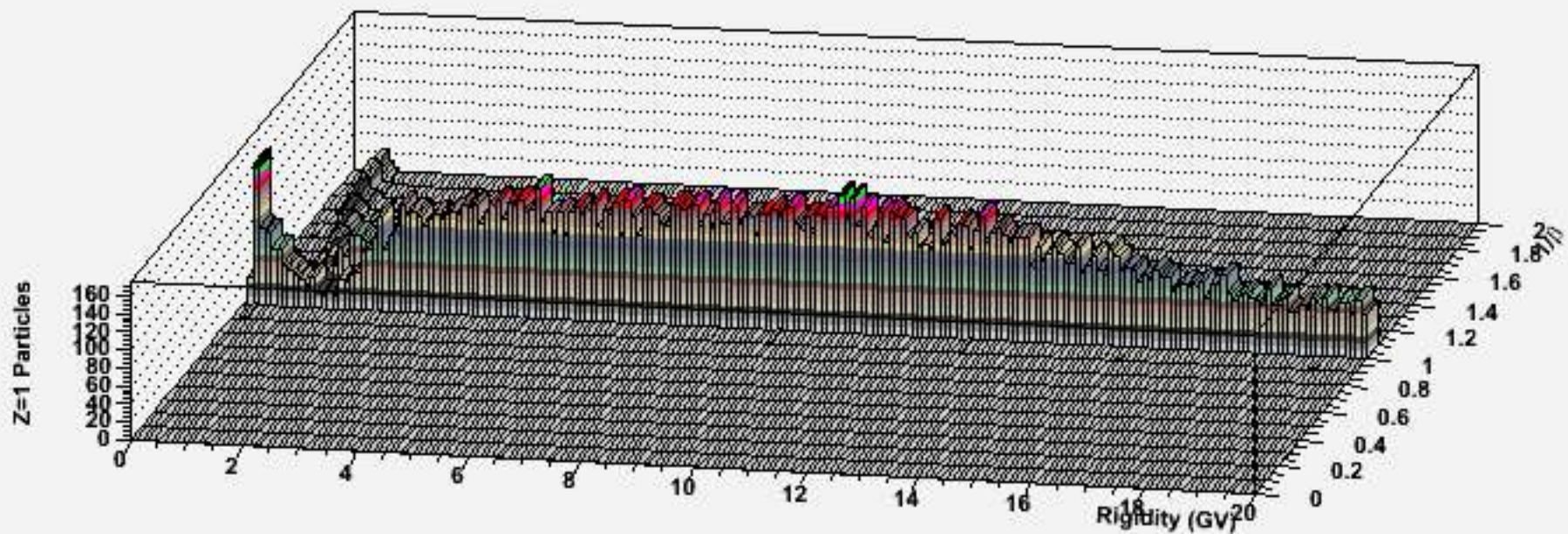
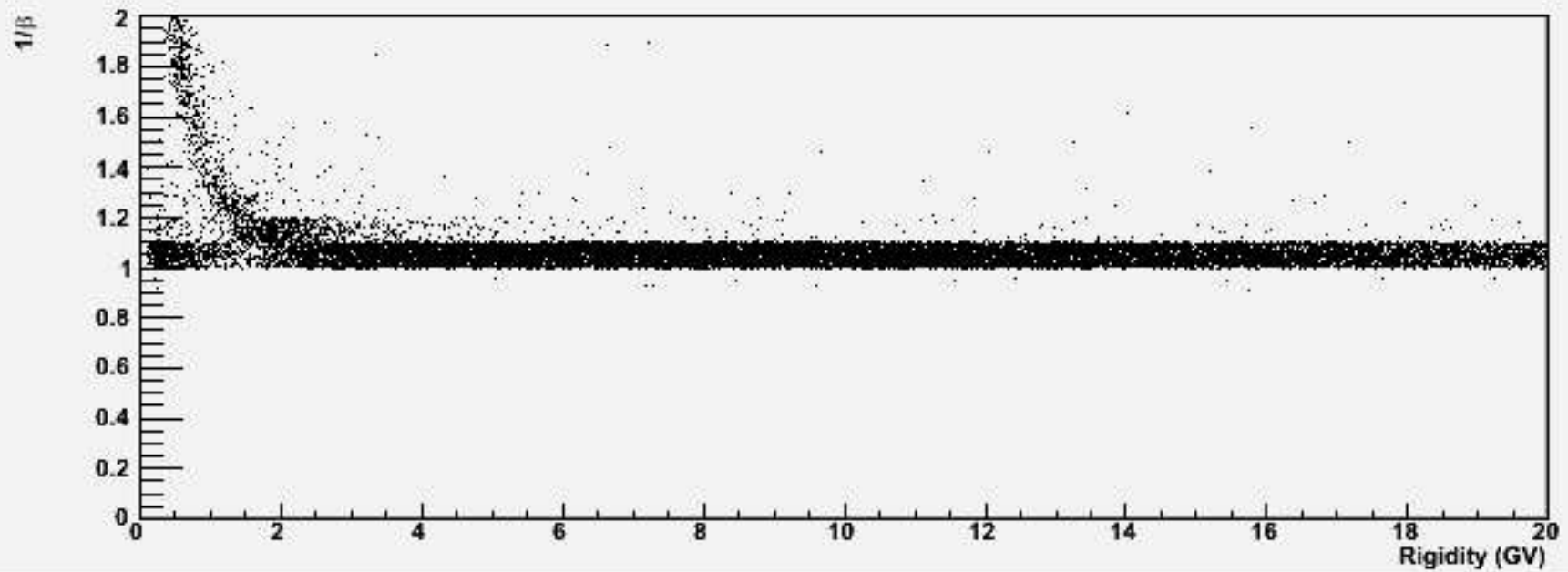
Proton candidates: $\text{charge} * \text{sign}(\text{Pmom}) = +1$

Helium candidates: $\text{charge} * \text{sign}(\text{Pmom}) = +2$

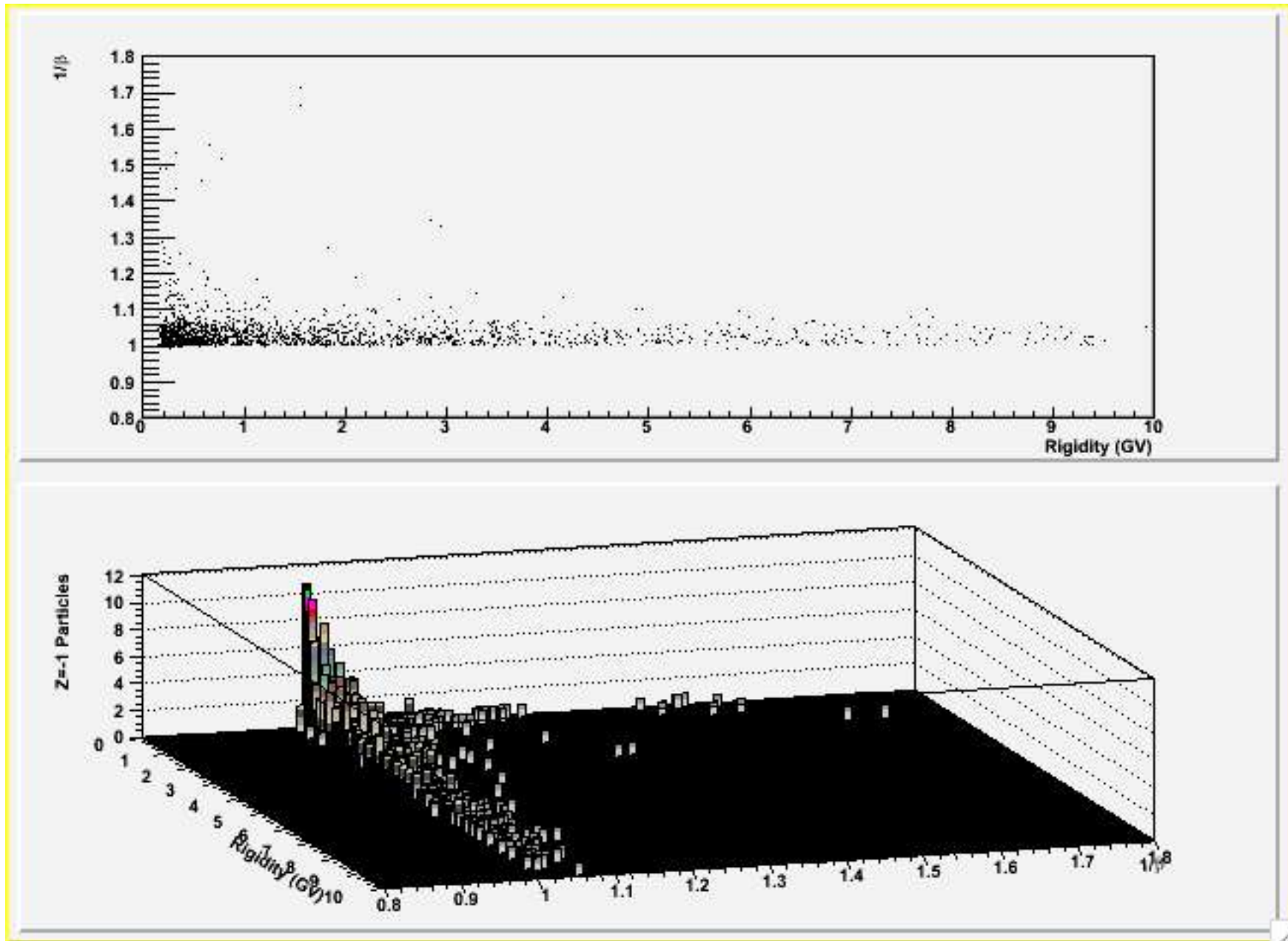
Helium candidates, $1/\beta$ vs |Rigidity|:



Proton candidates, $1/\beta$ vs $|\text{Rigidity}|$:

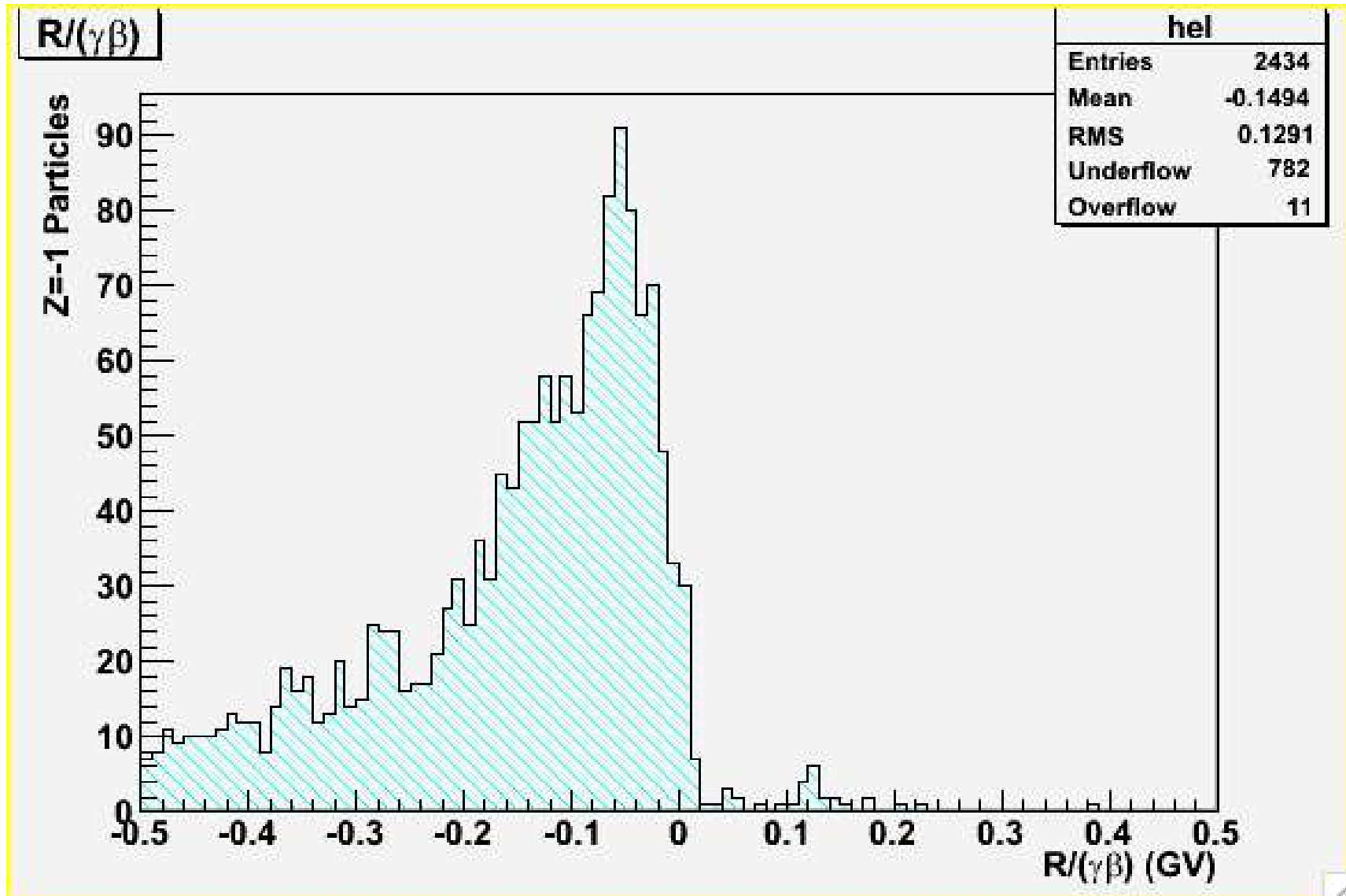


Electron candidates, $1/\beta$ vs $|\text{Rigidity}|$:

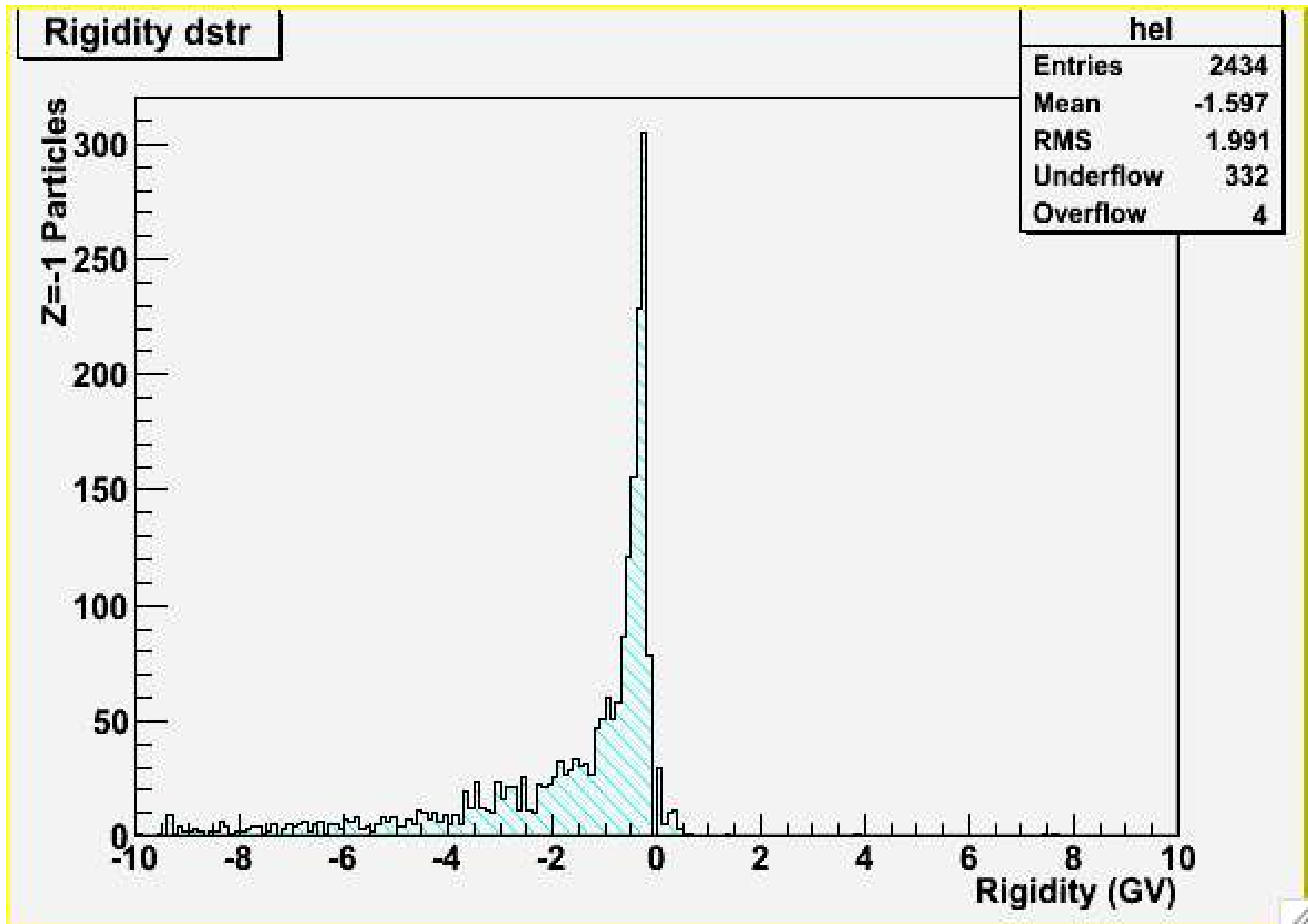


Electron candidates, $R/(\gamma\beta)$ distribution (should be peak at m/Z):

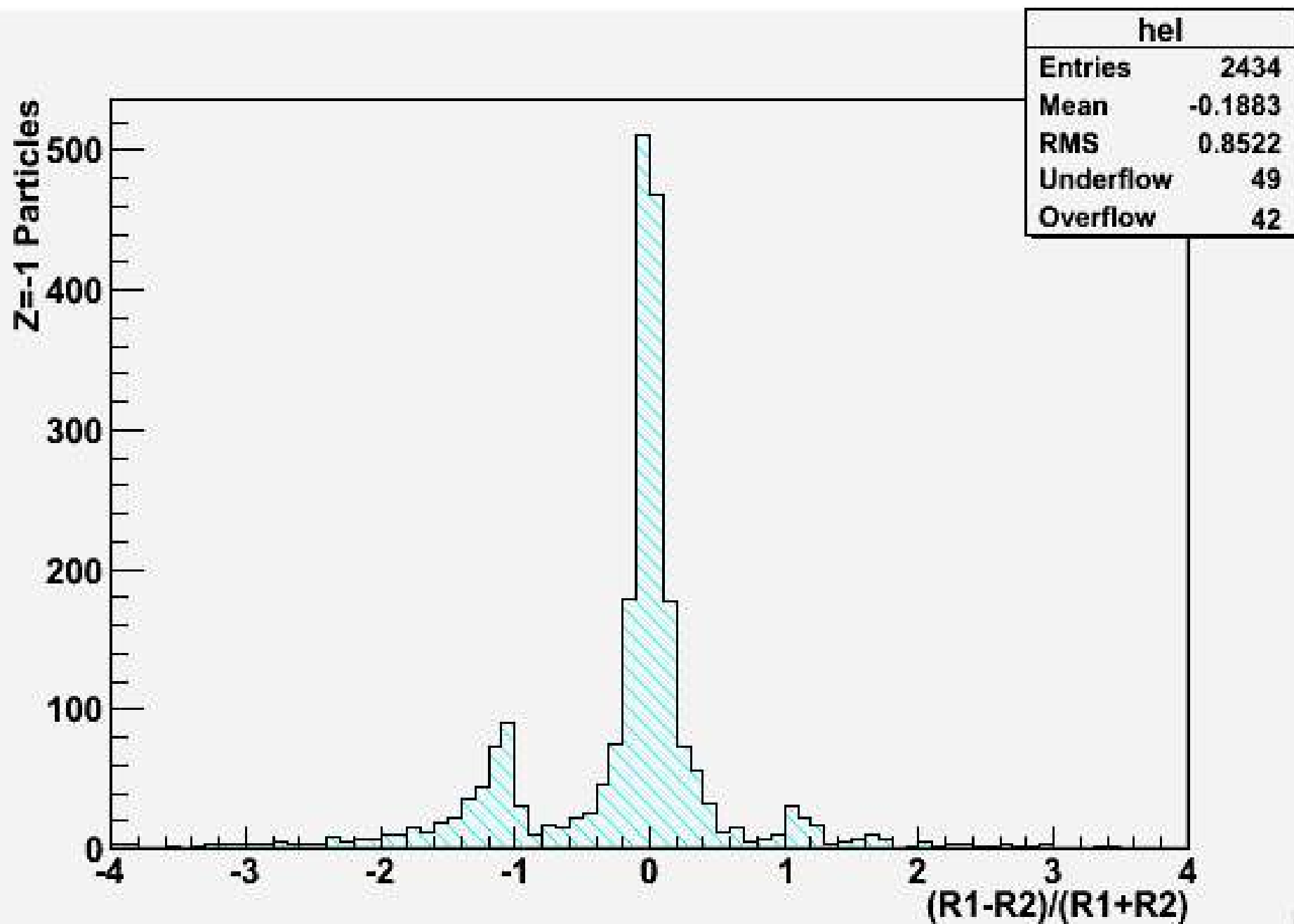
- contamination from pions and muons
- events with wrong rigidity sign



Electron candidates, (signed) Rigidity distribution:

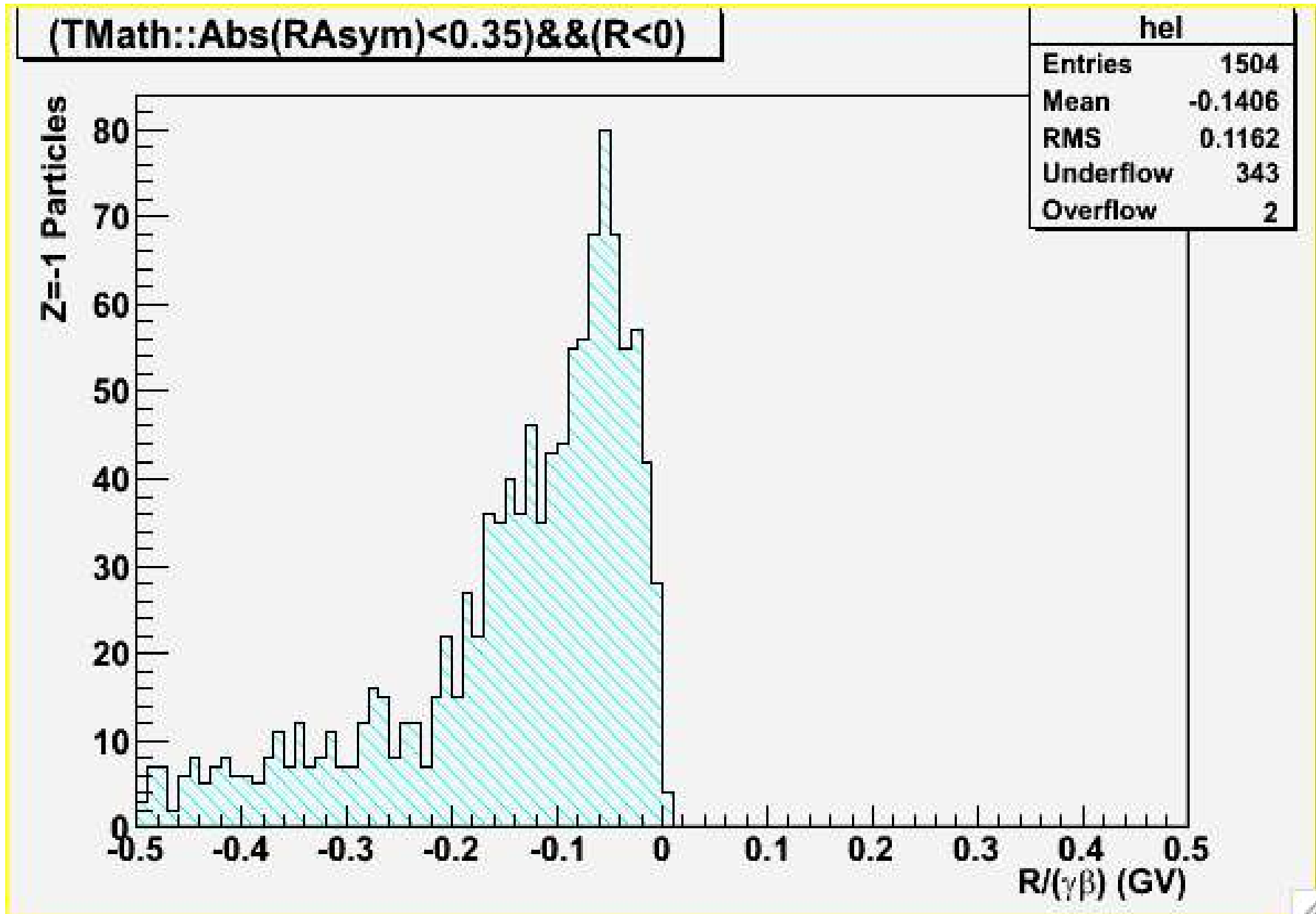


Electron candidates, Rigidity asymmetry $\Sigma=(R1-R2)/(R1+R2)$ distribution:

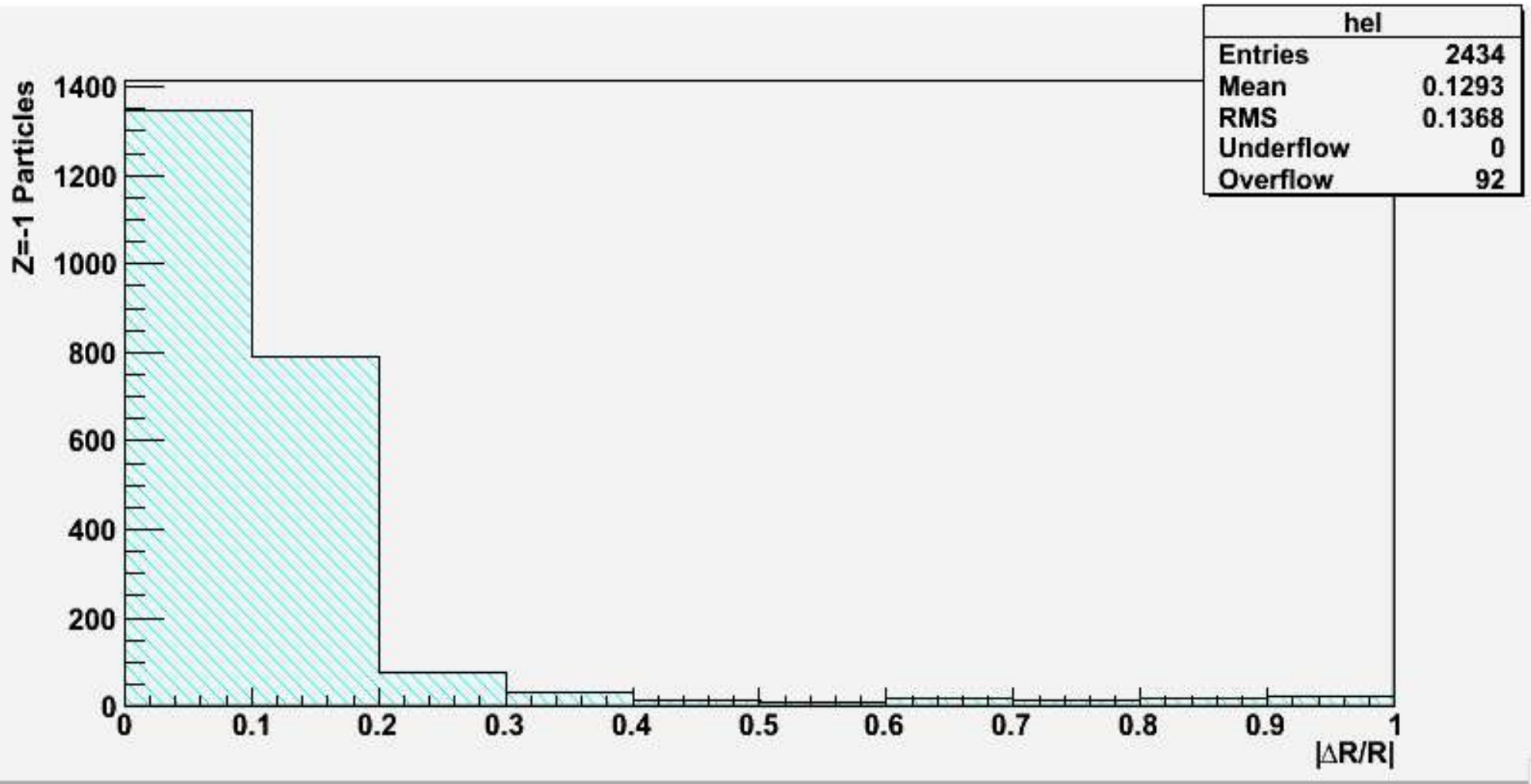


Electron candidates, $R/(\gamma\beta)$ distribution

Additional selection cut: $R < 0$ and $|\Sigma| < 0.35$

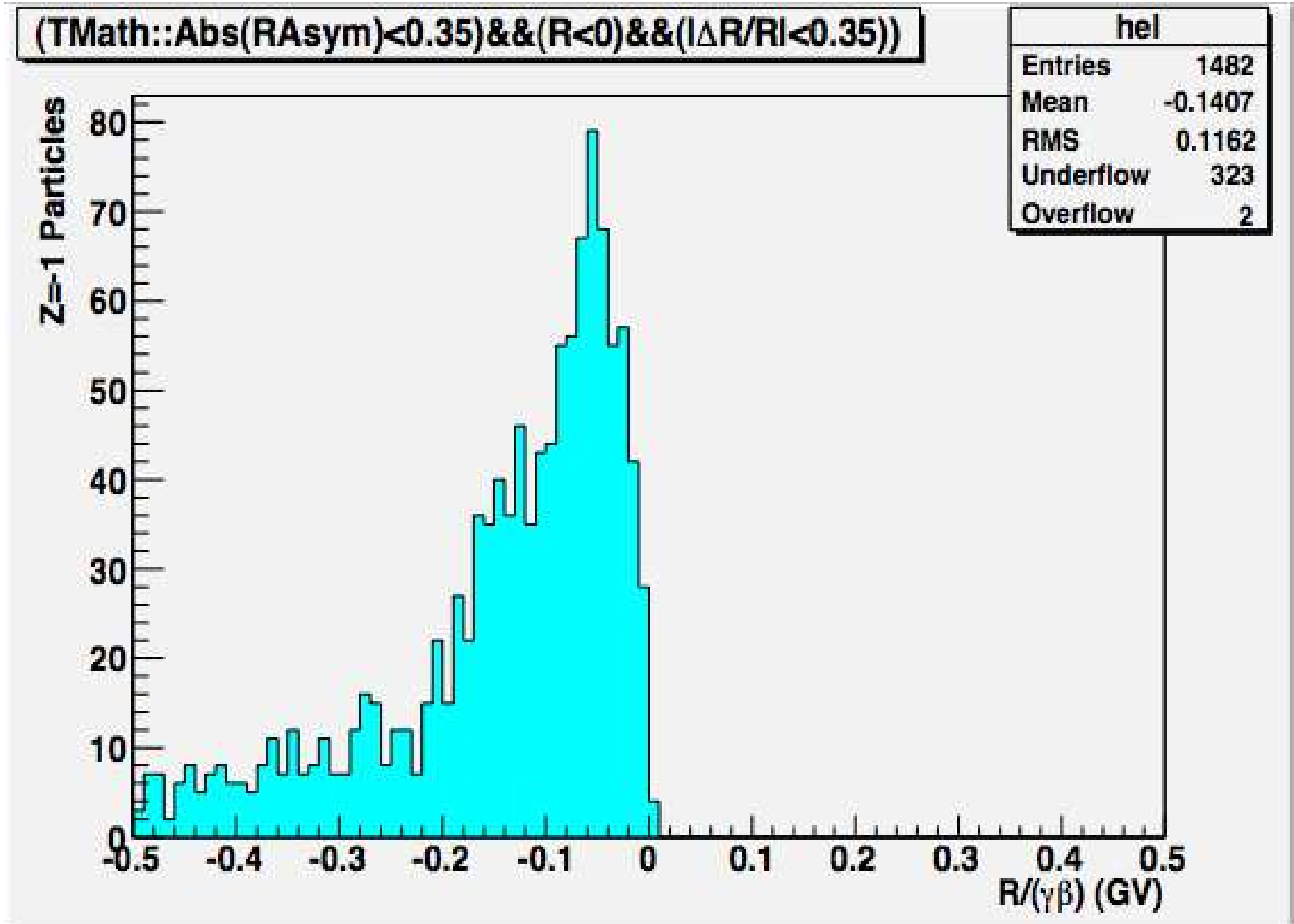


Electron candidates, $|\Delta R/R|$ distribution



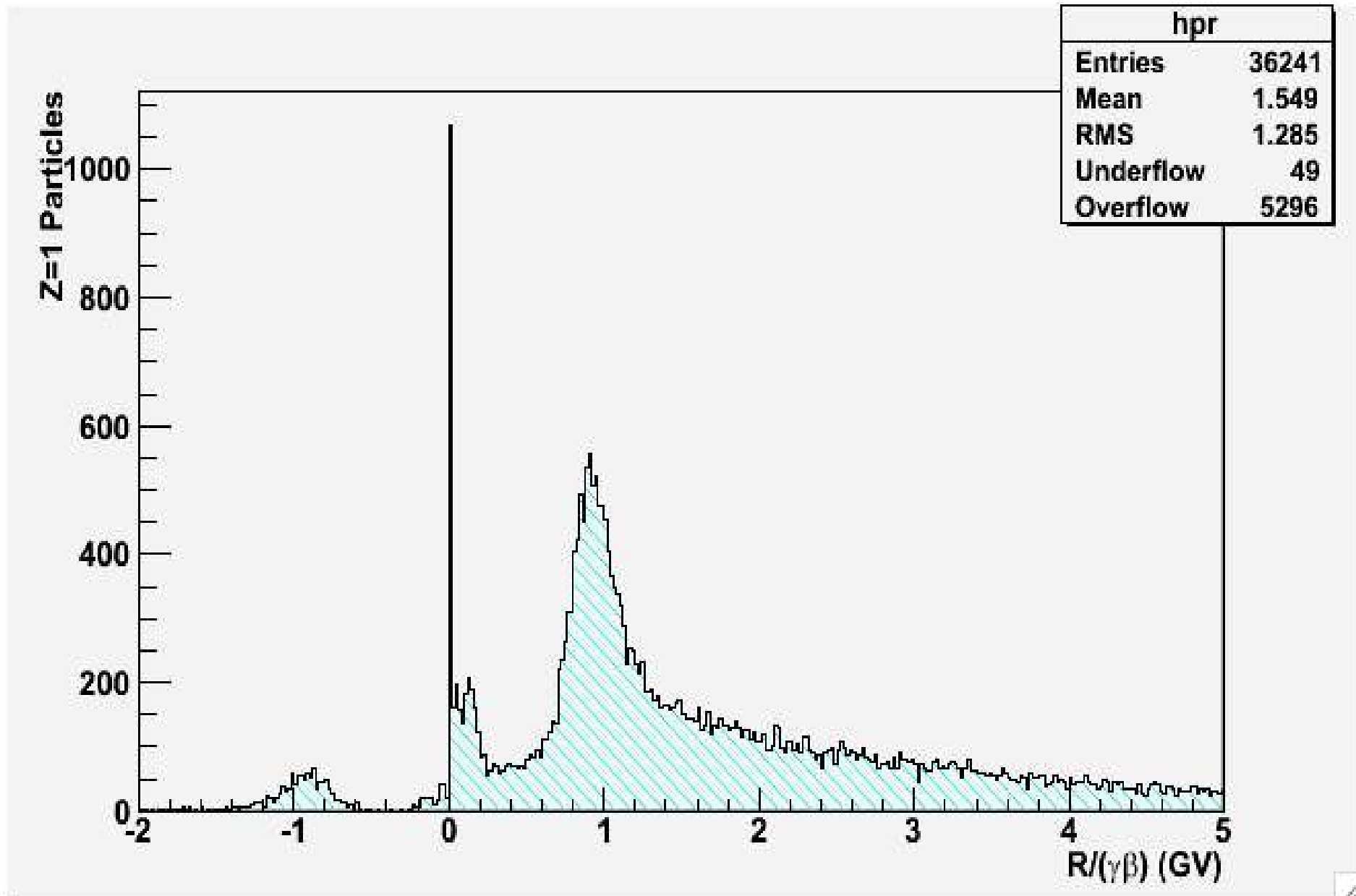
Electron candidates, $R/(\gamma\beta)$ distribution

Additional selection cut: $R < 0$ and $|\Sigma| < 0.35$ and $|\Delta R/R| < 0.35$

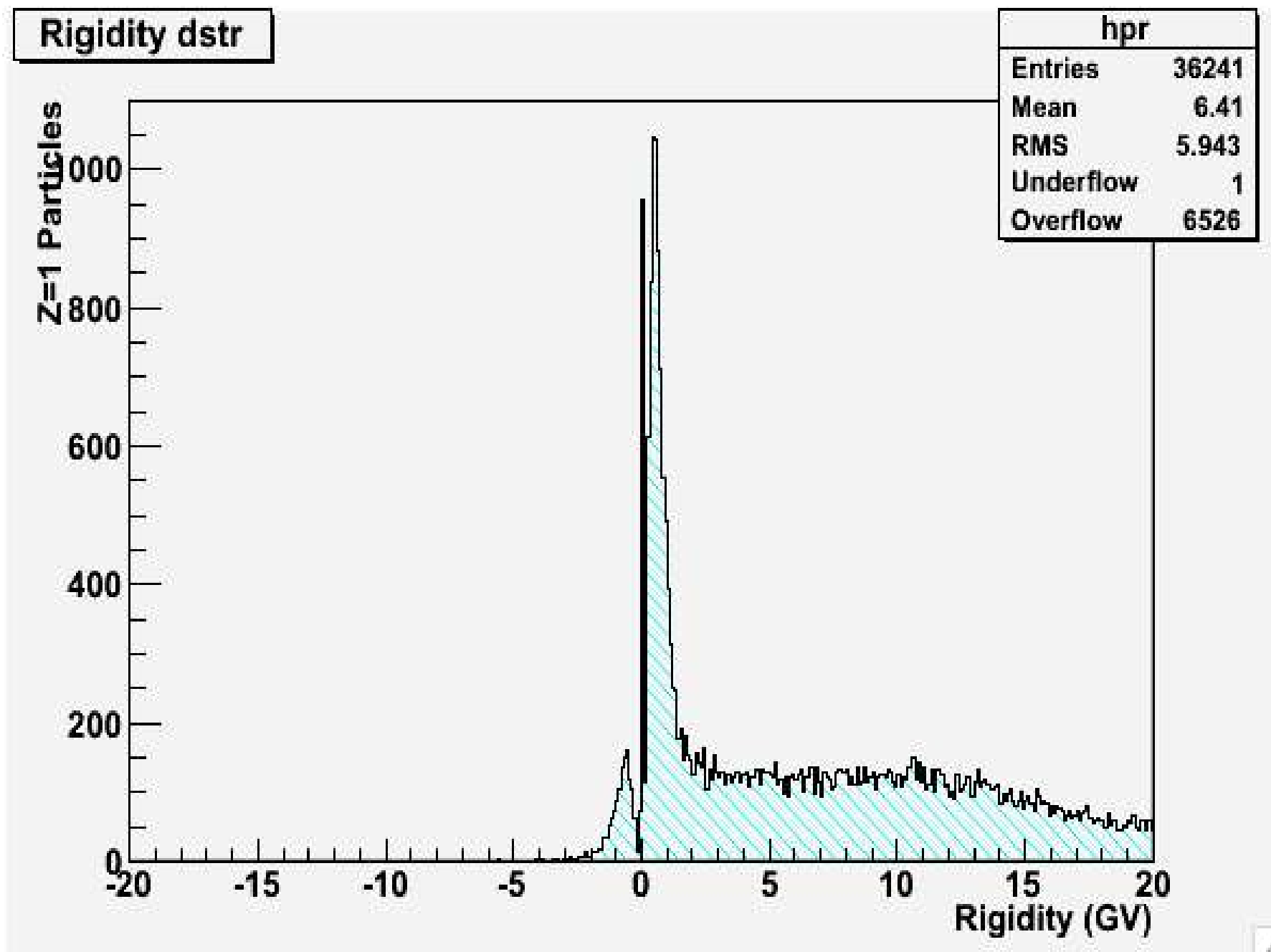


Proton candidates, $R/(\gamma\beta)$ distribution:

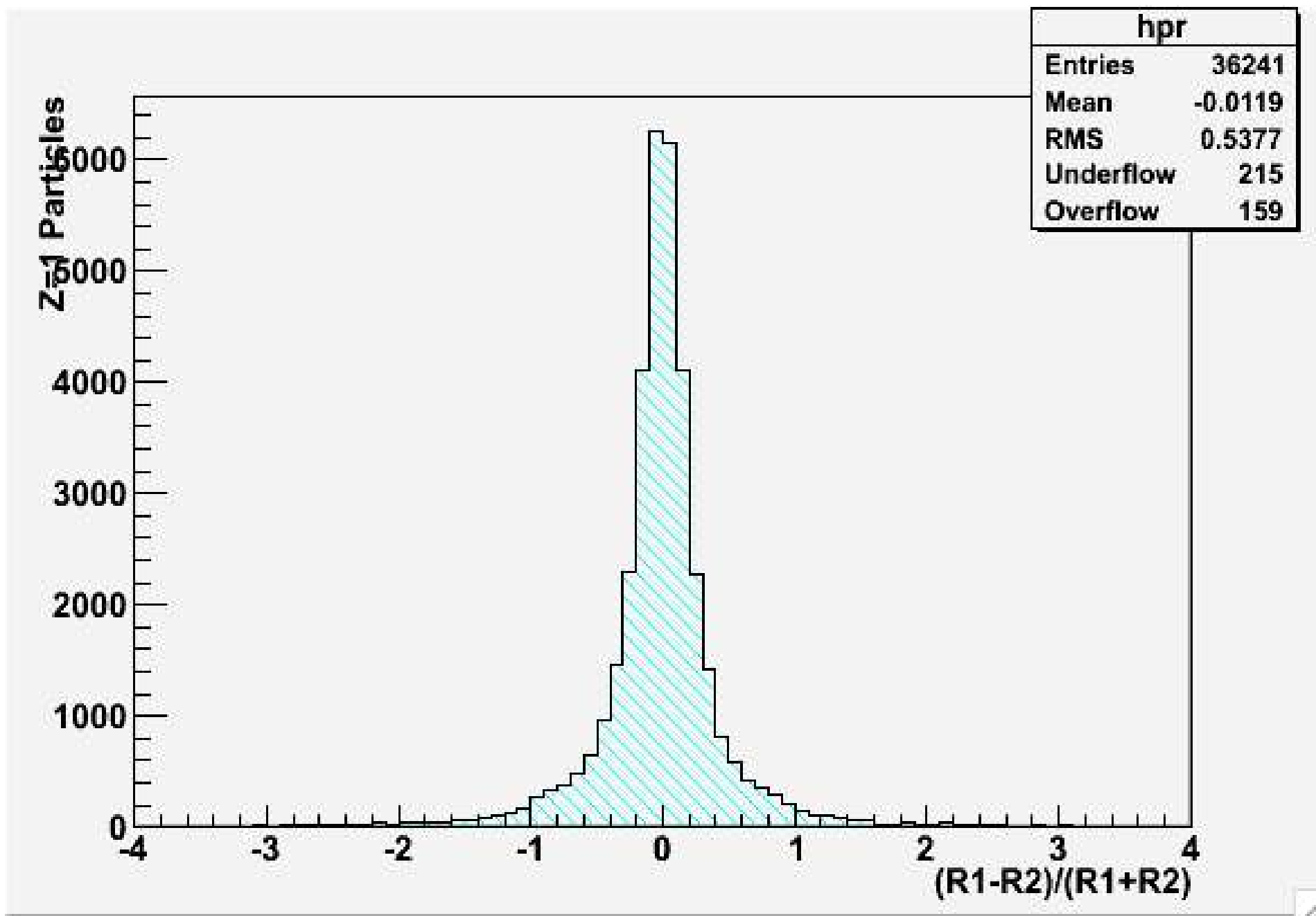
- contamination from pions and muons
- events with wrong rigidity sign



Proton candidates, (signed) Rigidity distribution:

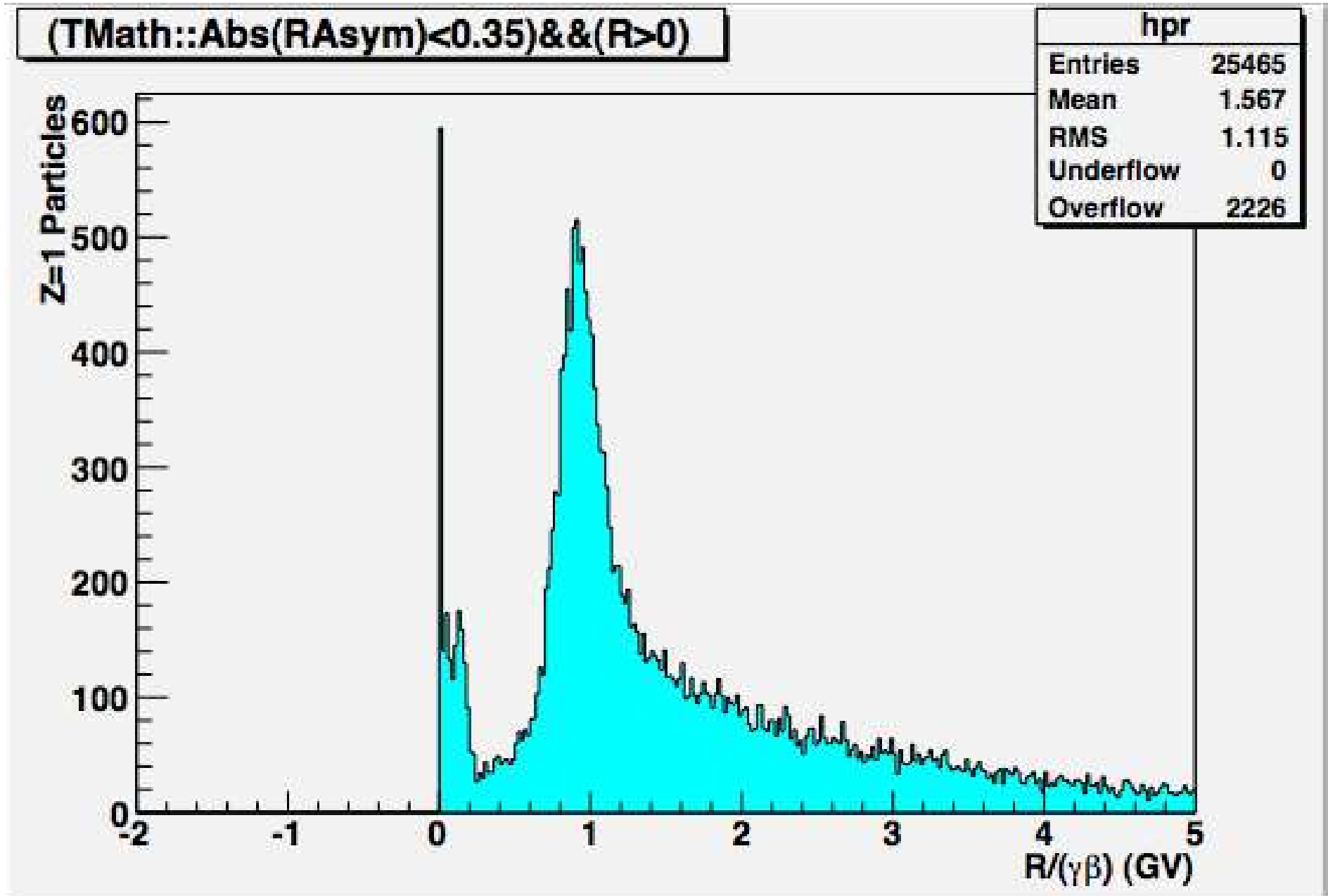


Proton candidates, Rigidity asymmetry $\Sigma=(R1-R2)/(R1+R2)$ distribution:



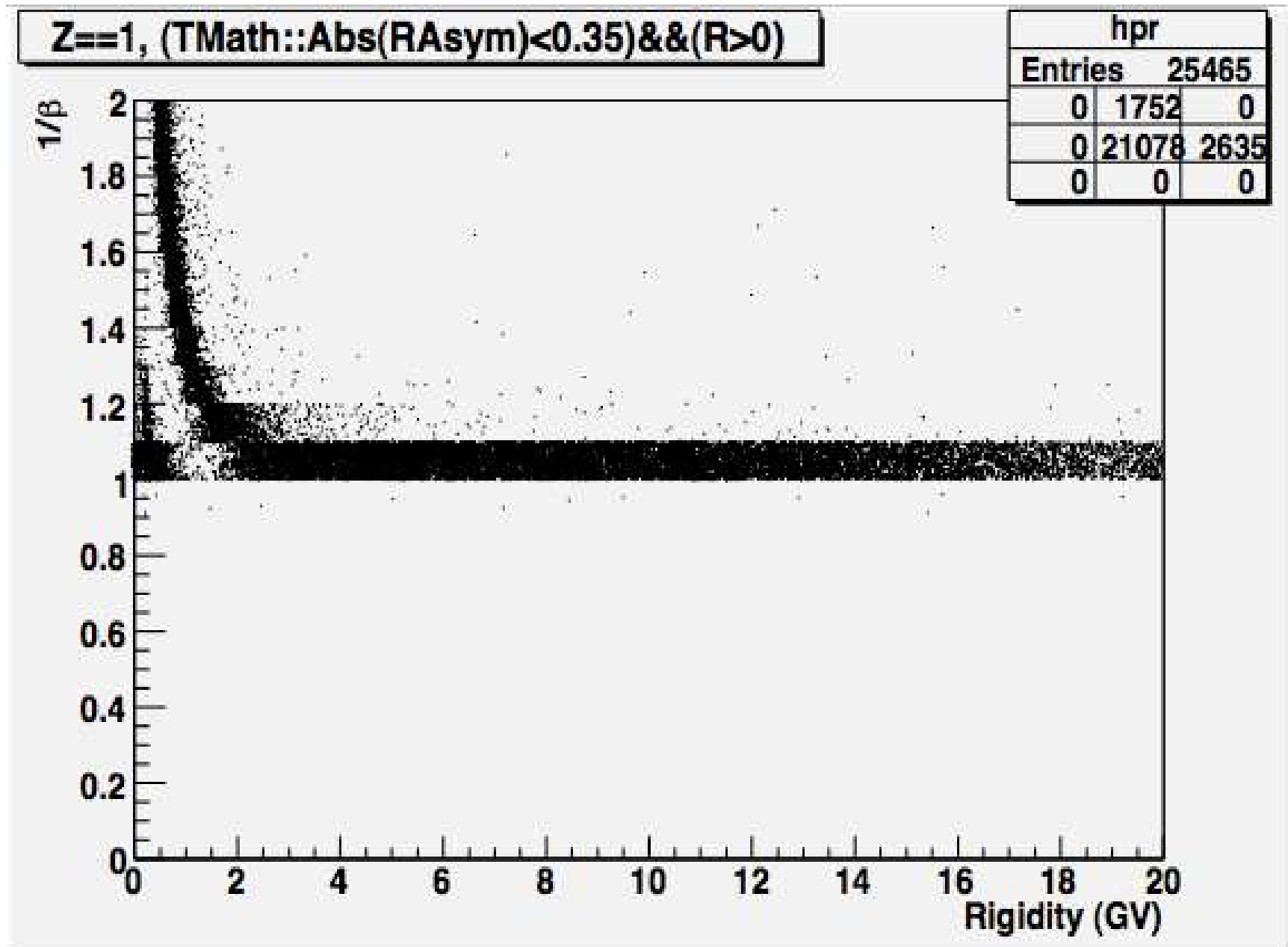
Proton candidates, $R/(\gamma\beta)$ distribution

Additional selection cut: $R < 0$ and $|\Sigma| < 0.35$

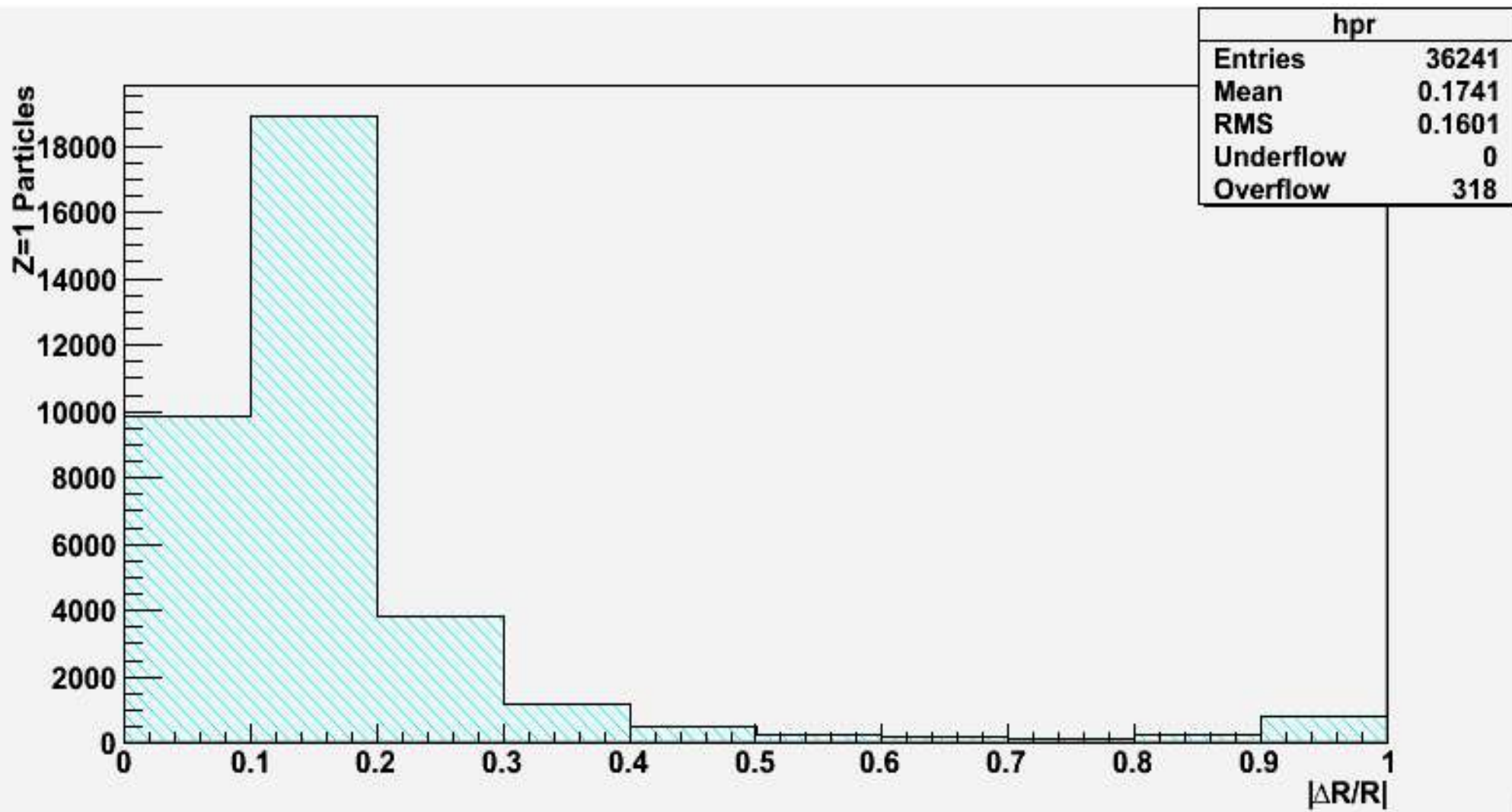


Proton candidates, $1/\beta$ vs Rigidity

Additional selection cut: $R > 0$ and $|\Sigma| < 0.35$

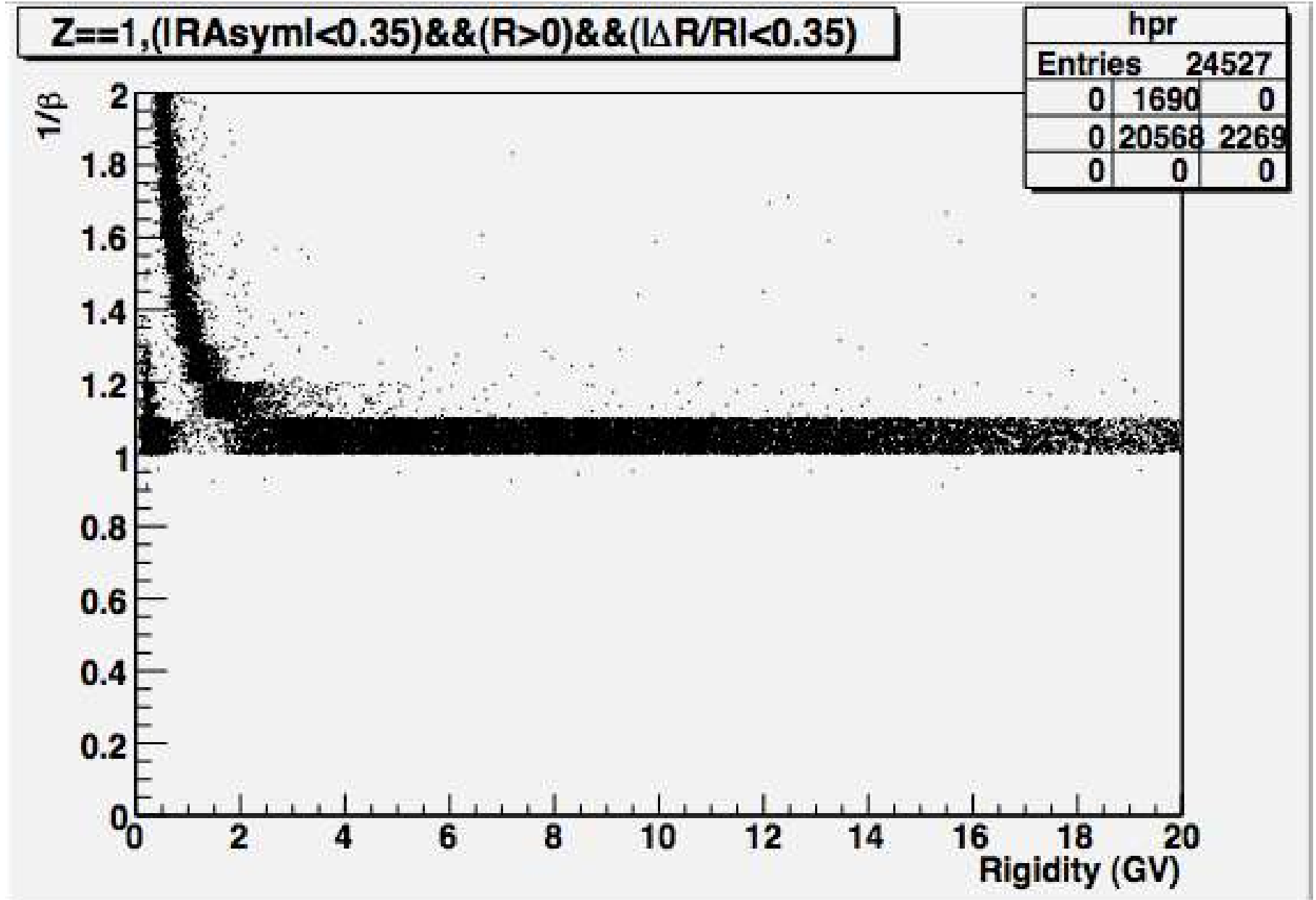


Proton candidates, $|\Delta R/R|$ distribution



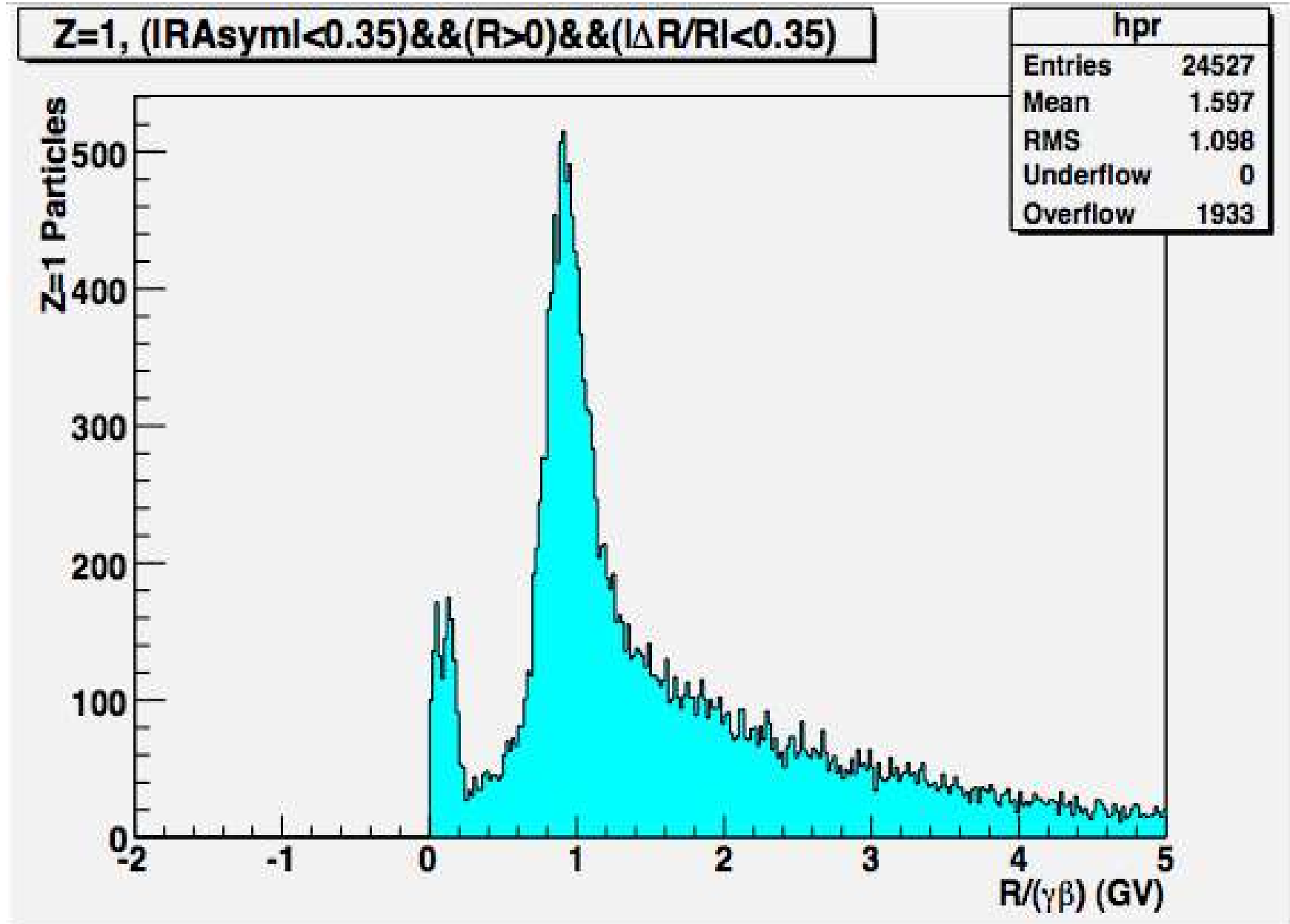
Proton candidates, $1/\beta$ vs Rigidity

Additional selection cut: $R > 0$ and $|\Sigma| < 0.35$ and $|\Delta R/R| < 0.35$



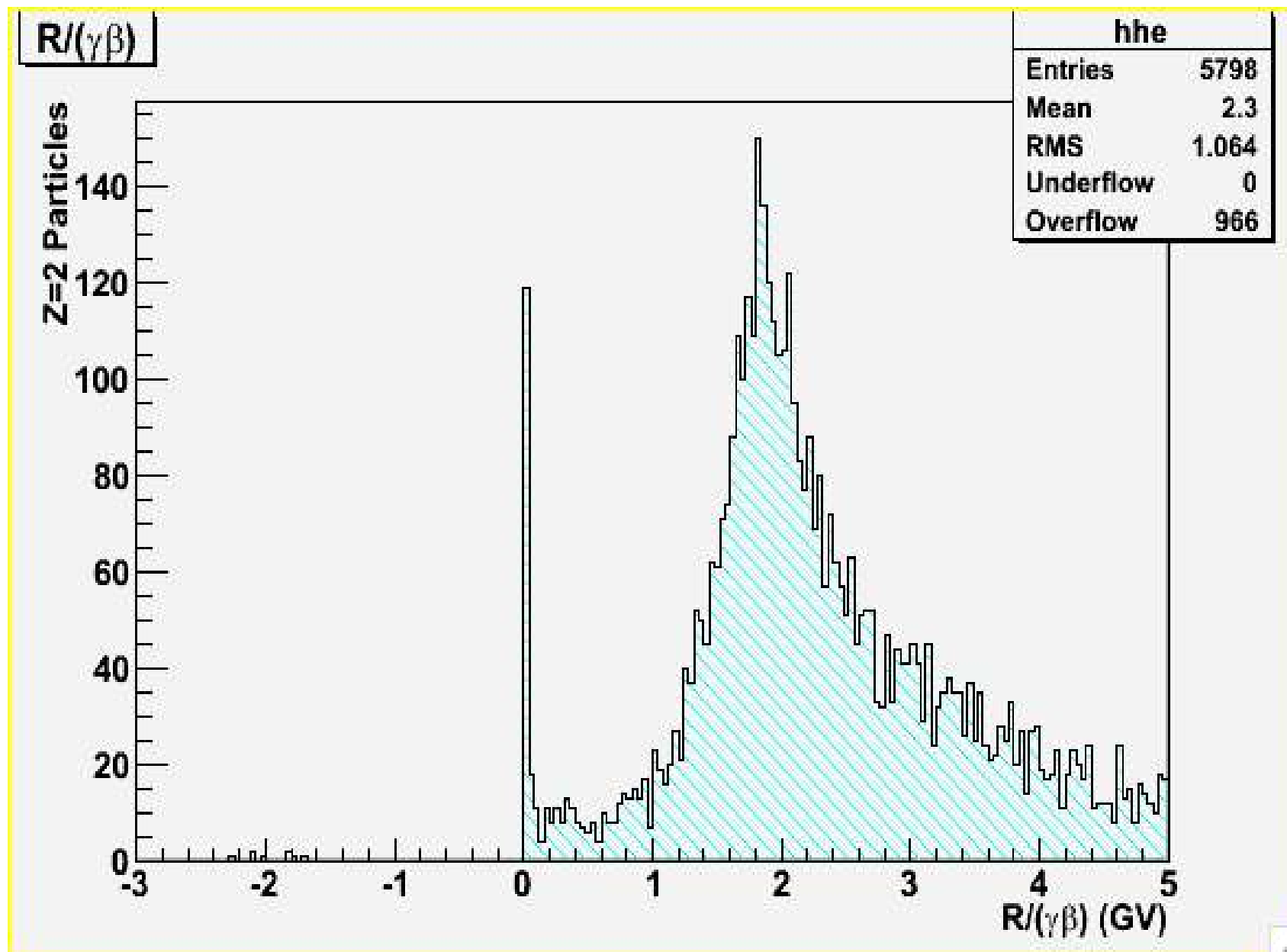
Proton candidates, $R/(\gamma\beta)$ distribution

Additional selection cut: $R > 0$ and $|\Sigma| < 0.35$ and $|\Delta R/R| < 0.35$

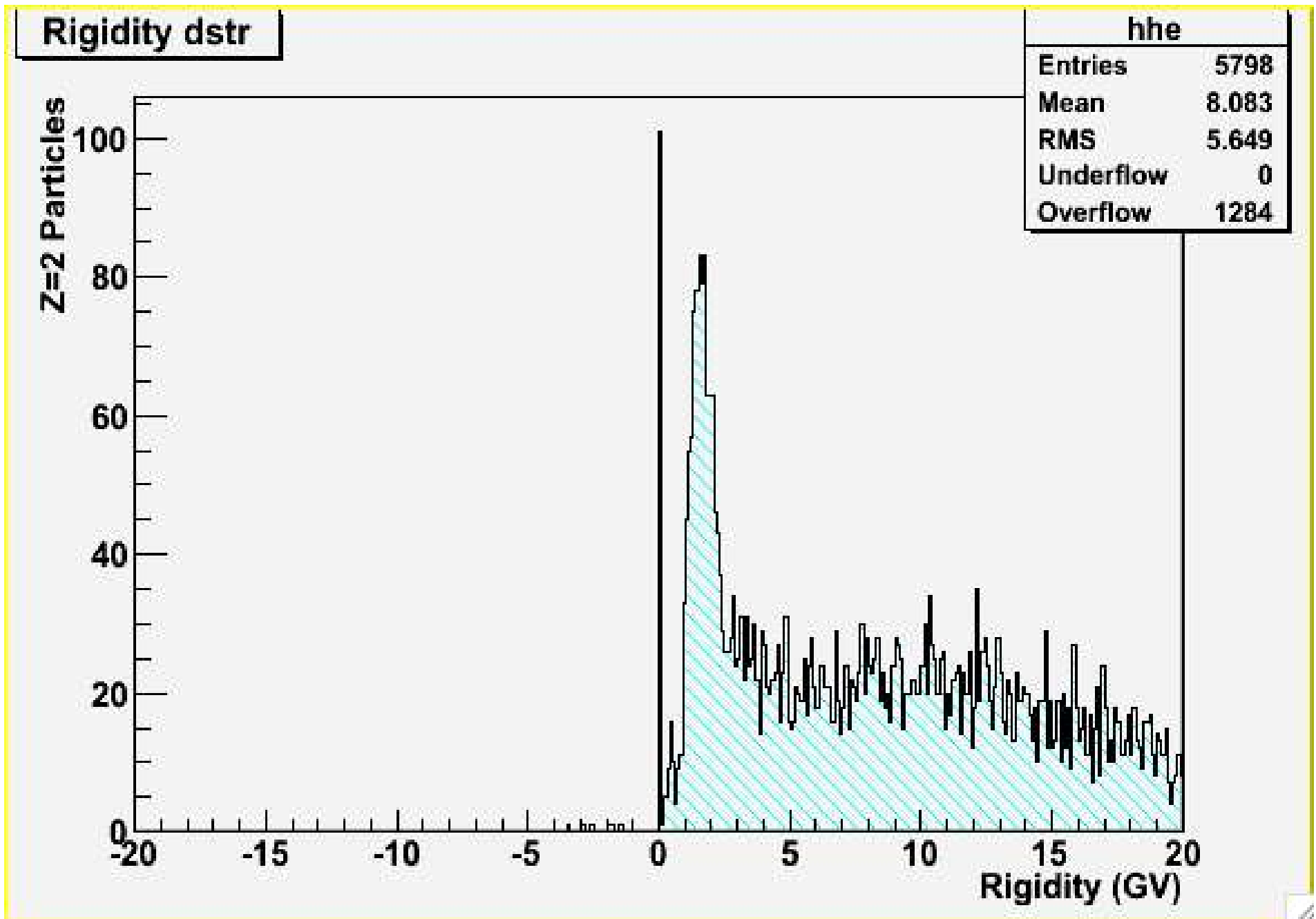


Helium candidates, $R/(\gamma\beta)$ distribution:

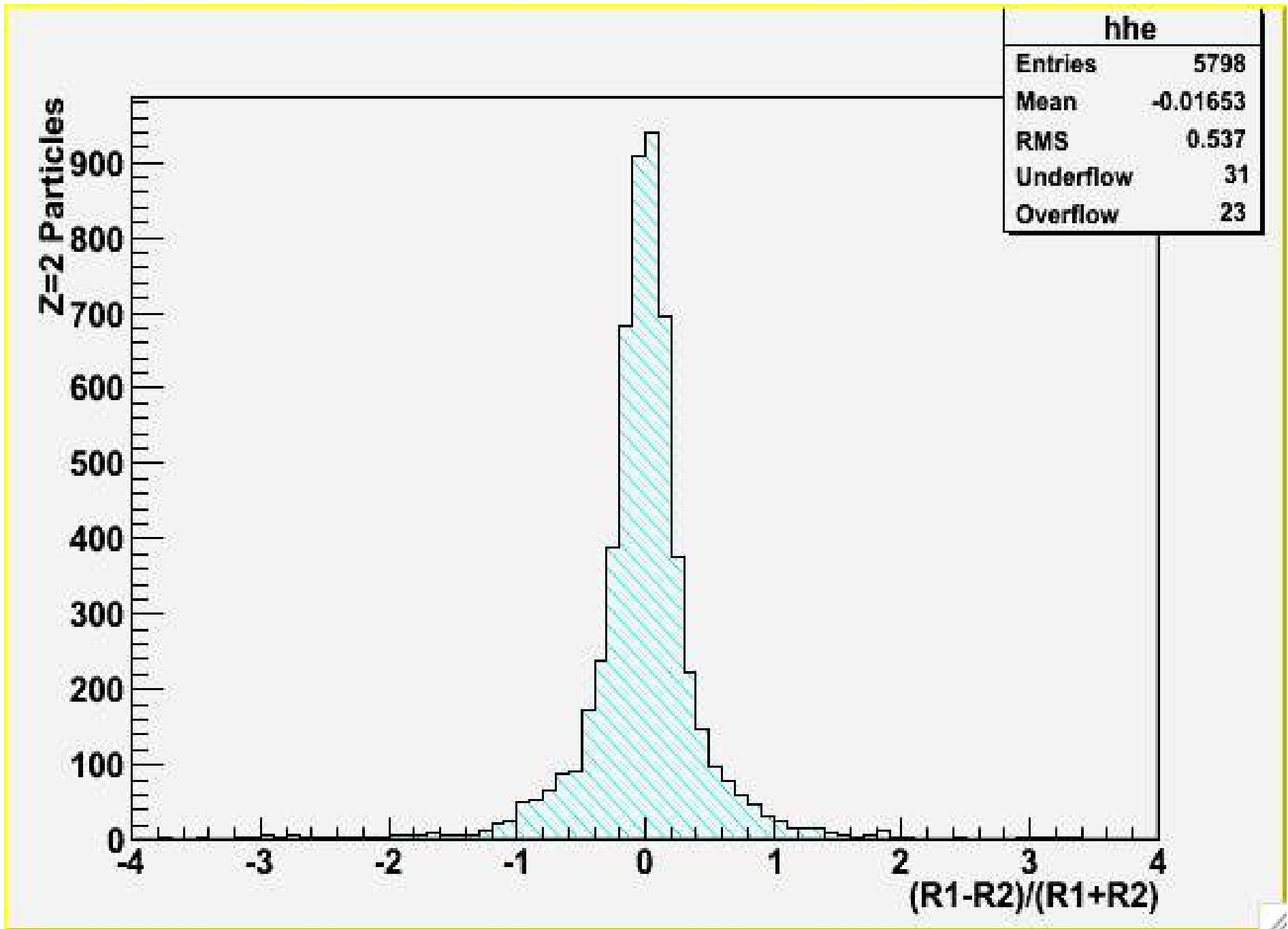
- contamination from other particles negligible
- few events with wrong rigidity sign



Helium candidates, (signed) Rigidity distribution:

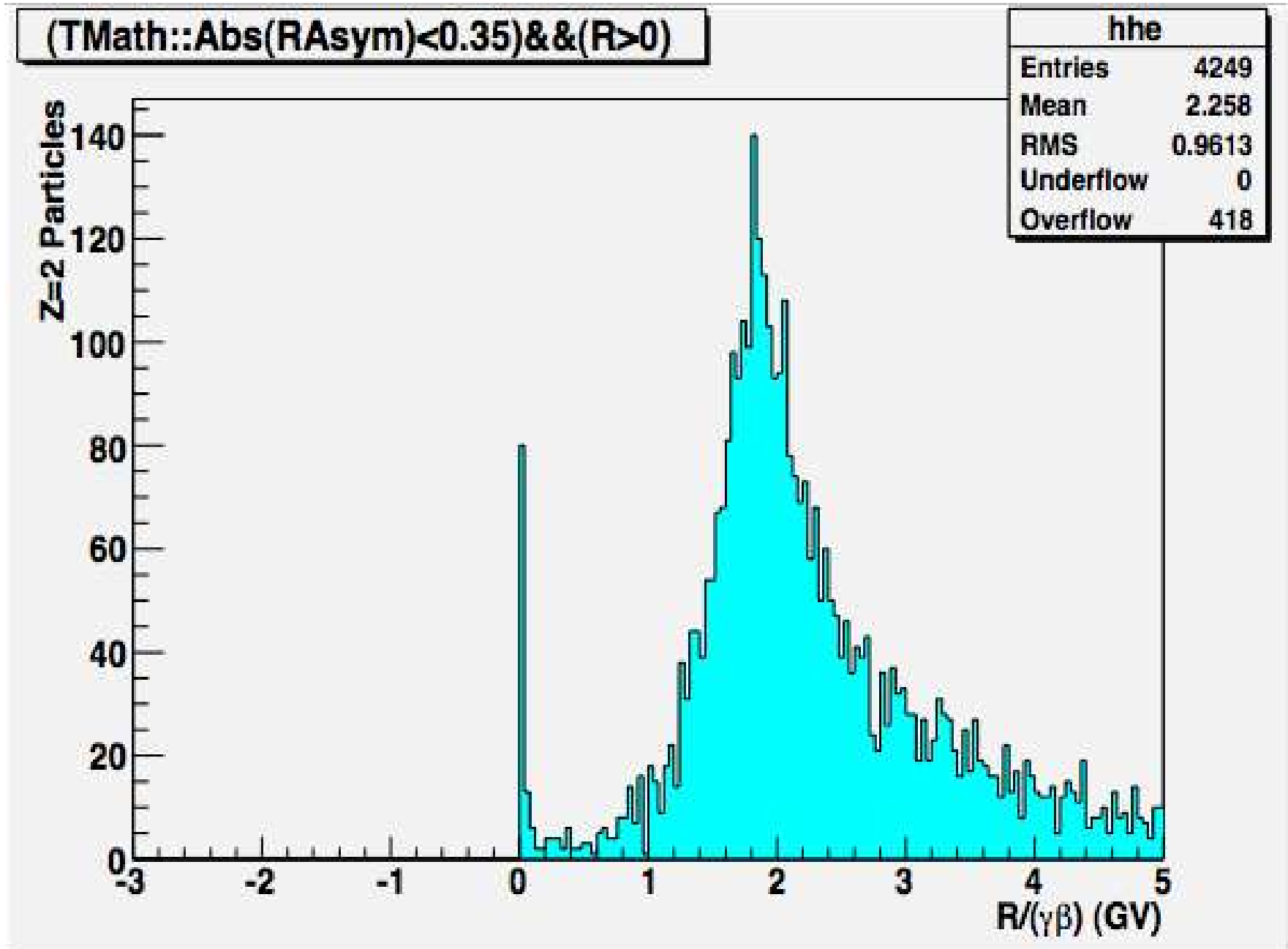


Helium candidates, Rigidity asymmetry $\Sigma=(R1-R2)/(R1+R2)$ distribution:



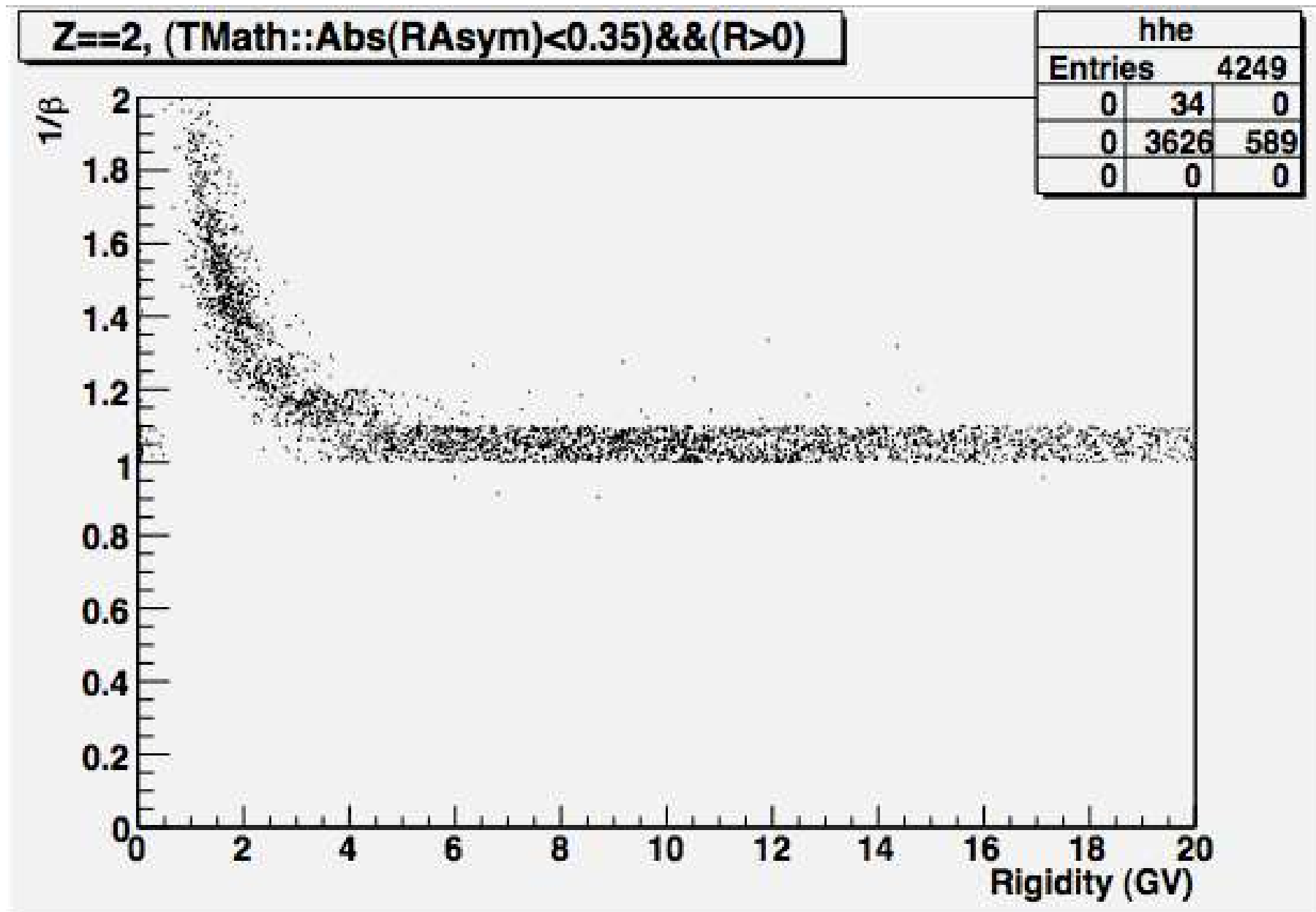
Helium candidates, $R/(\gamma\beta)$ distribution

Additional selection cut: $R > 0$ and $|\Sigma| < 0.35$

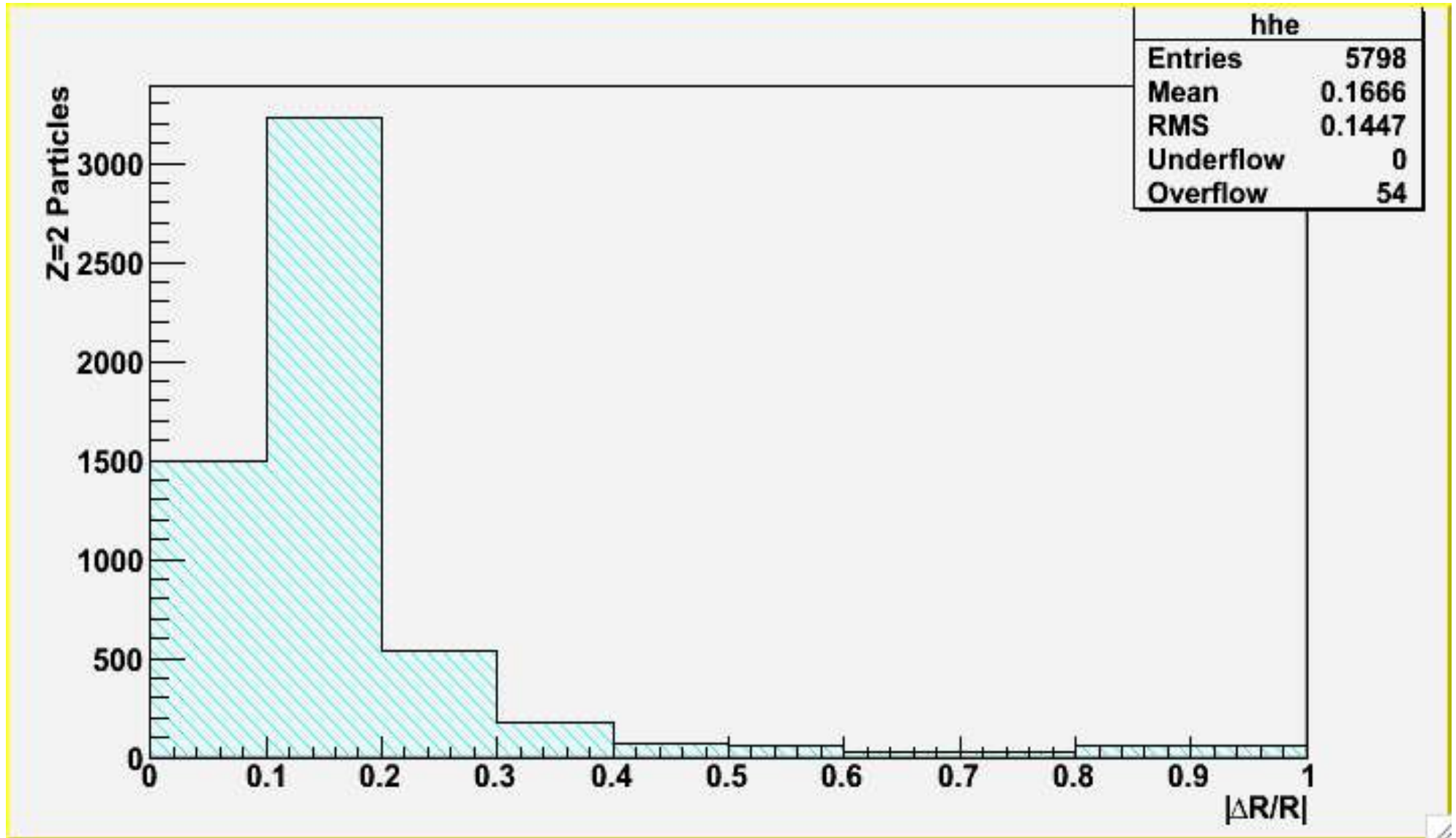


Helium candidates, $1/\beta$ vs Rigidity

Additional selection cut: $R > 0$ and $|\Sigma| < 0.35$

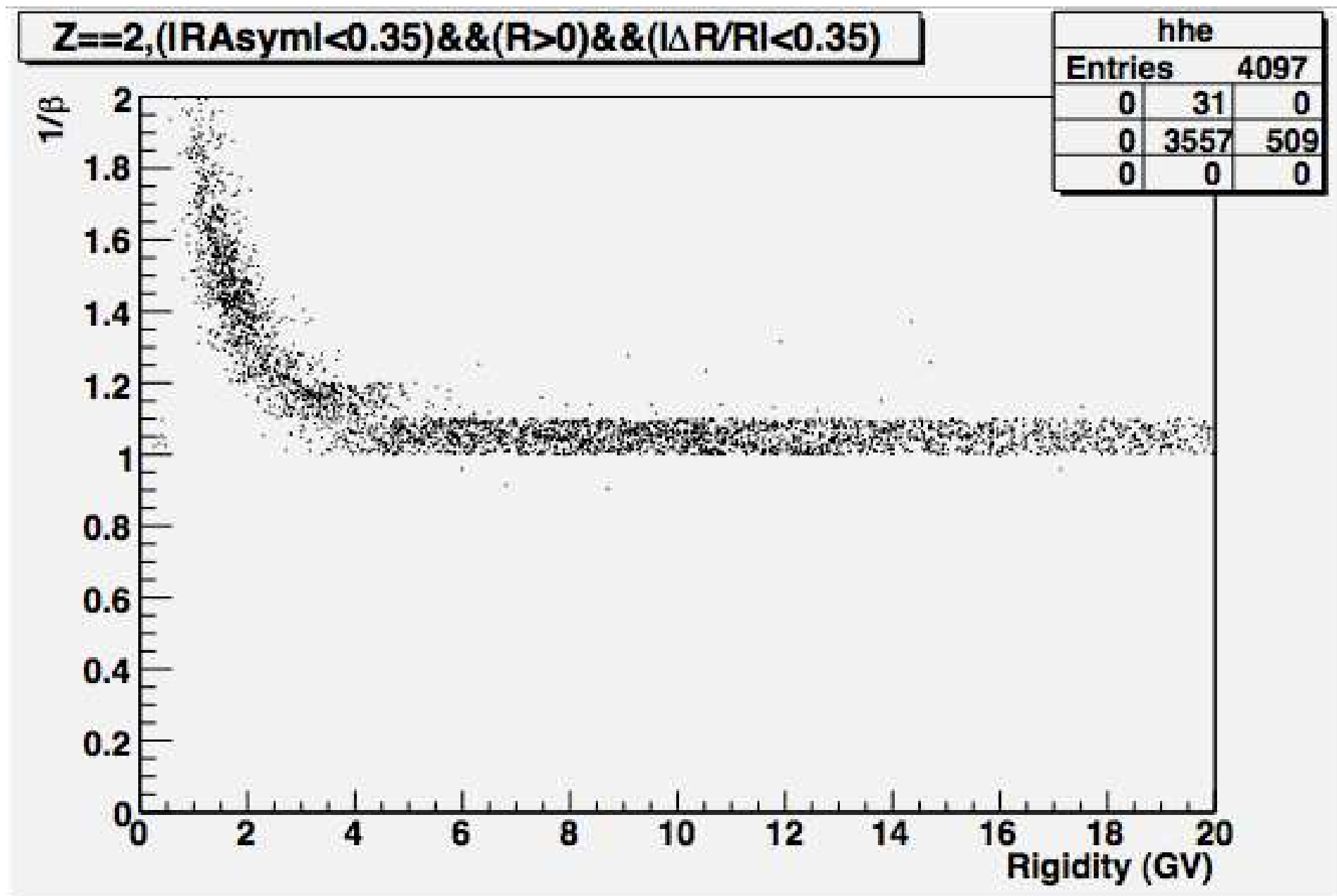


Helium candidates, $|\Delta R/R|$ distribution



Helium candidates, $1/\beta$ vs Rigidity

Additional selection cut: $R > 0$ and $|\Sigma| < 0.35$ and $|\Delta R/R| < 0.35$



Helium candidates, $R/(\gamma\beta)$ distribution

Additional selection cut: $R > 0$ and $|\Sigma| < 0.35$ and $|\Delta R/R| < 0.35$

