

# Bethe-Heitler Data

$$\gamma p \rightarrow e^+ e^- (p)$$

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# Ground Level Cuts

## Preselection Cuts

1. Default GlueX Cuts: [https://halldweb.jlab.org/wiki/index.php/Spring\\_2017\\_Analysis\\_Launch\\_Cuts](https://halldweb.jlab.org/wiki/index.php/Spring_2017_Analysis_Launch_Cuts)
2. Require  $E/p = 0.7$  for electron and positron tracks in FCAL and BCAL

## DSelector Cuts

1. Cut on Coherent Peak:  $8.12 < E_{\gamma} < 8.88$
2. Require both electron and positron tracks have hits in the FCAL
3. Require both electron and positron tracks have hits in the TOF
4. Require  $dMinKinFitCL > 10E-6$
5. Eliminate  $NumUnusedTracks \geq 2$

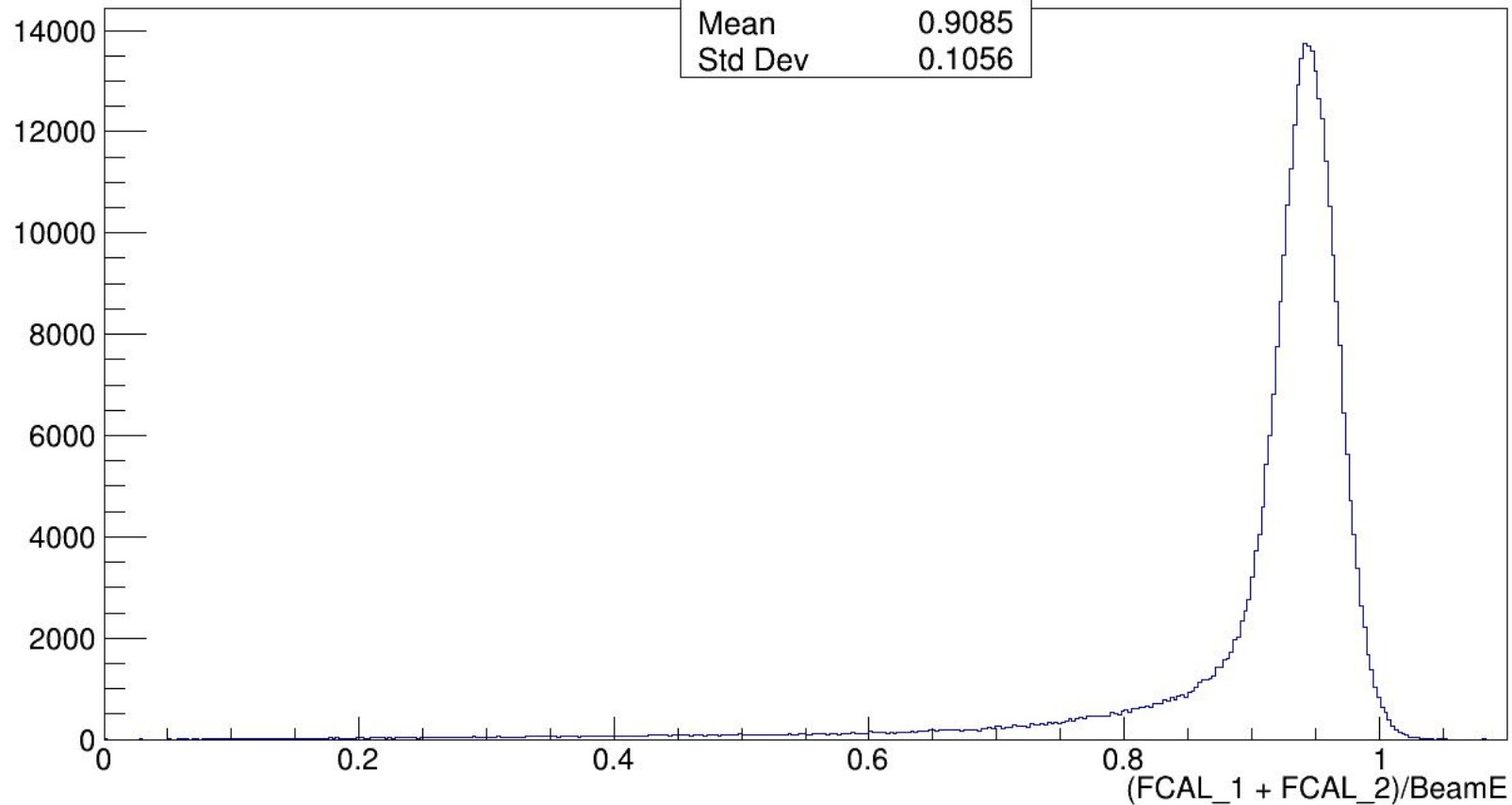
# Additional Cuts Investigated

1.  $-3\sigma < p/E - \langle p/E \rangle < +2\sigma$  Lubomir's Cut
2. Eliminate `Energy_UnusedShowers > 0`

Looking for signal in invariant mass and  
FCAL elasticity plots

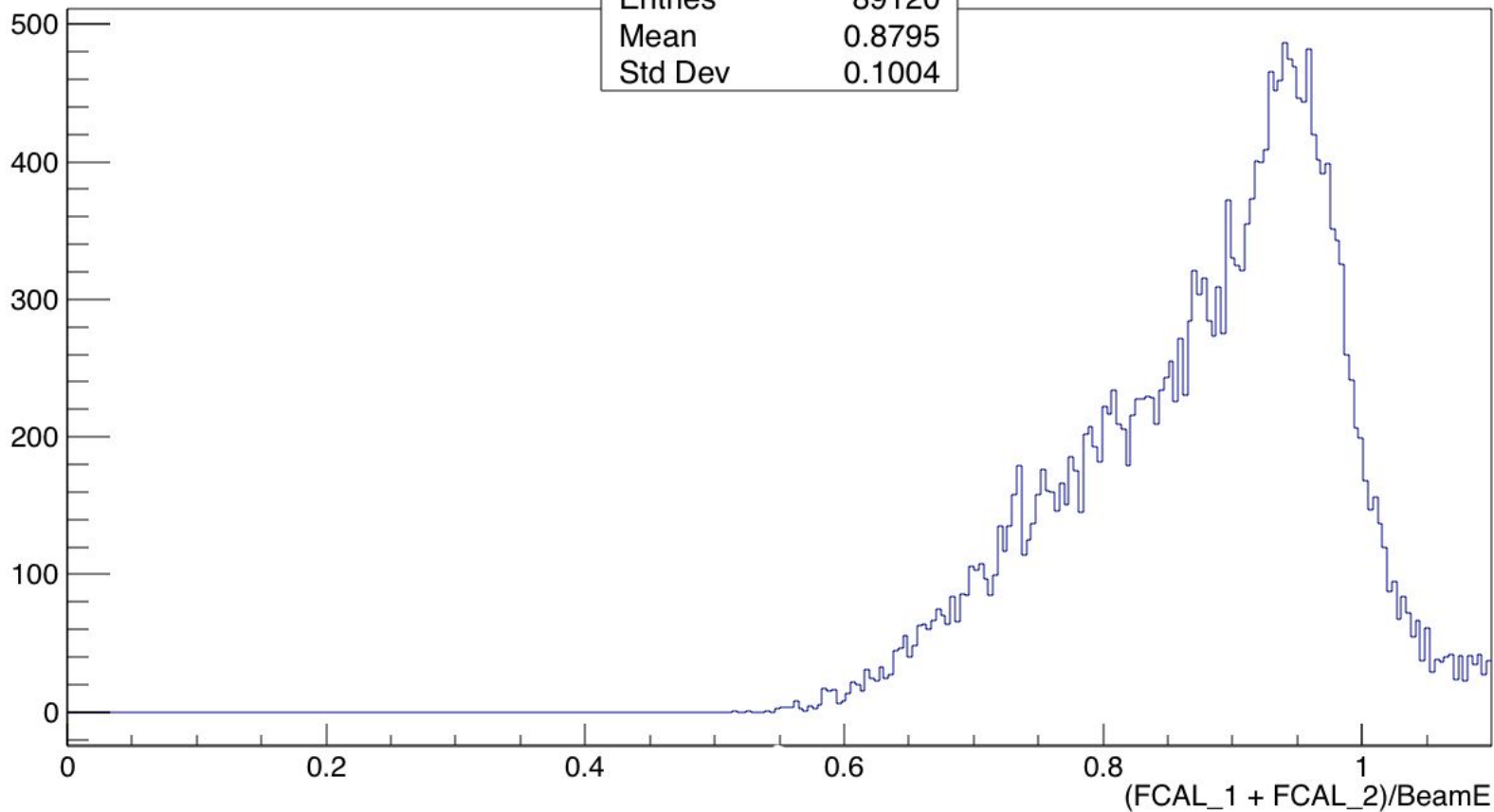
MC

| Sum of 2e Tracks FCAL/CoherentPeak |        |
|------------------------------------|--------|
| Entries                            | 357801 |
| Mean                               | 0.9085 |
| Std Dev                            | 0.1056 |

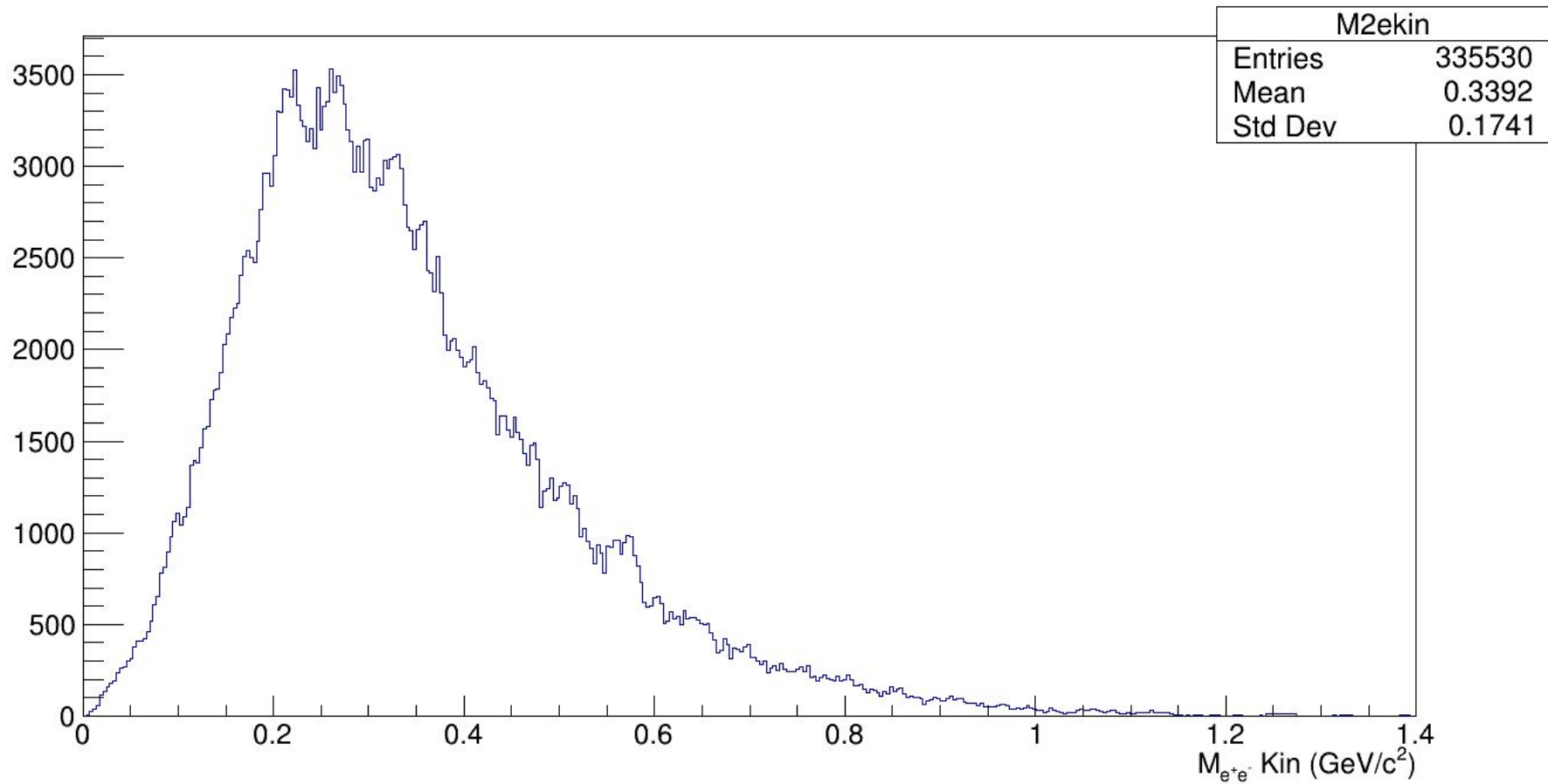


GF

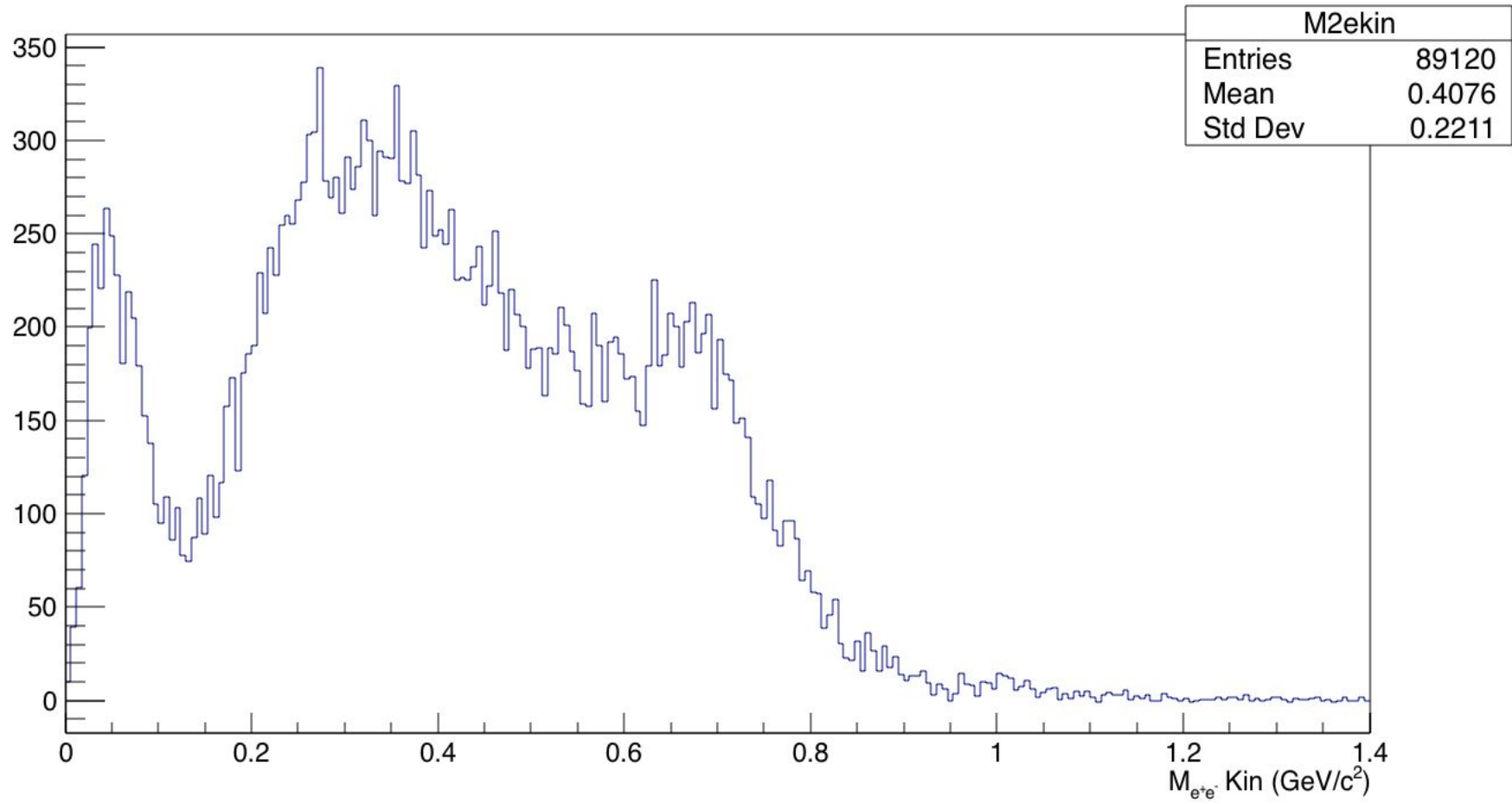
| FCAL_Elasticity |        |
|-----------------|--------|
| Entries         | 89120  |
| Mean            | 0.8795 |
| Std Dev         | 0.1004 |



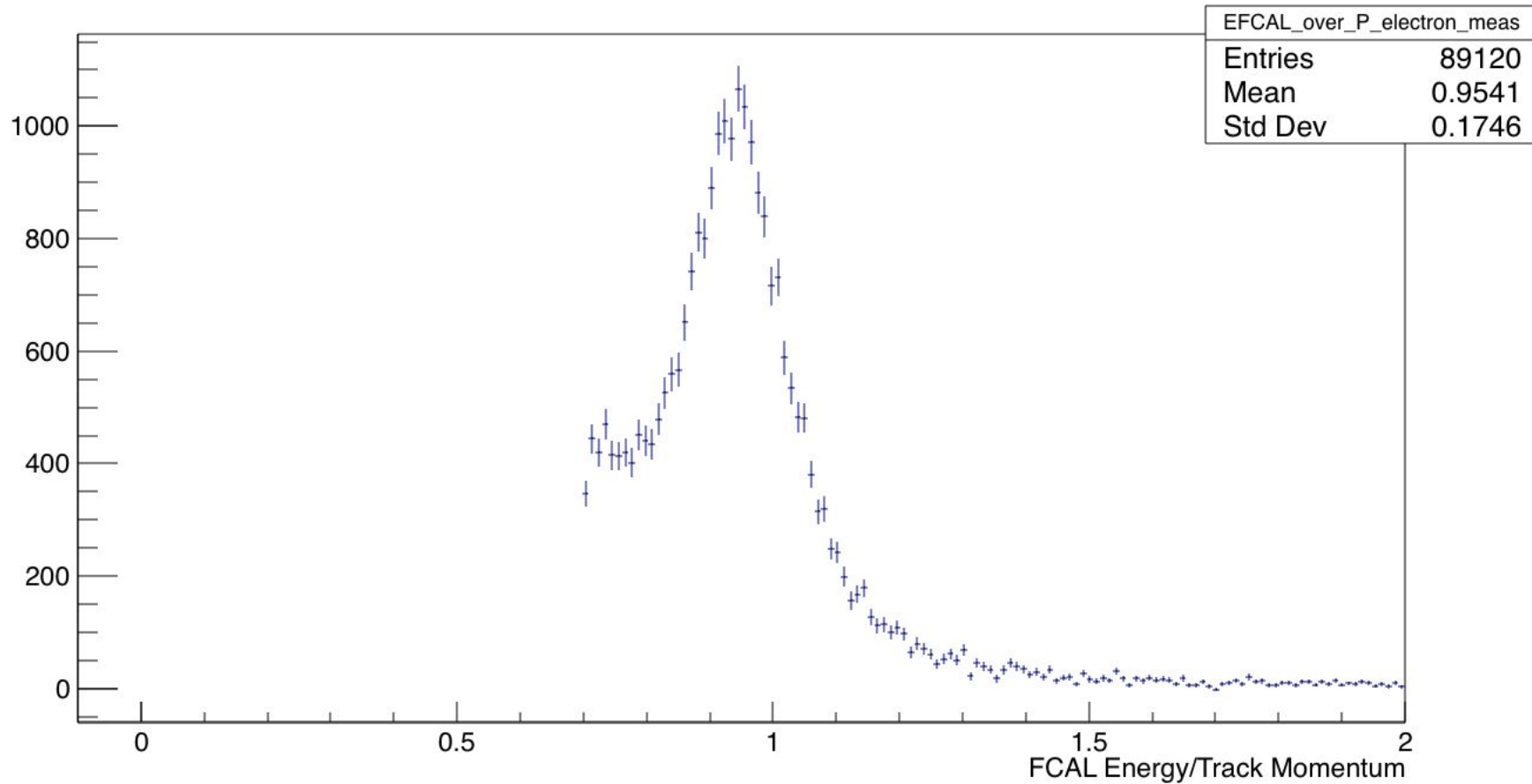
MC



GF

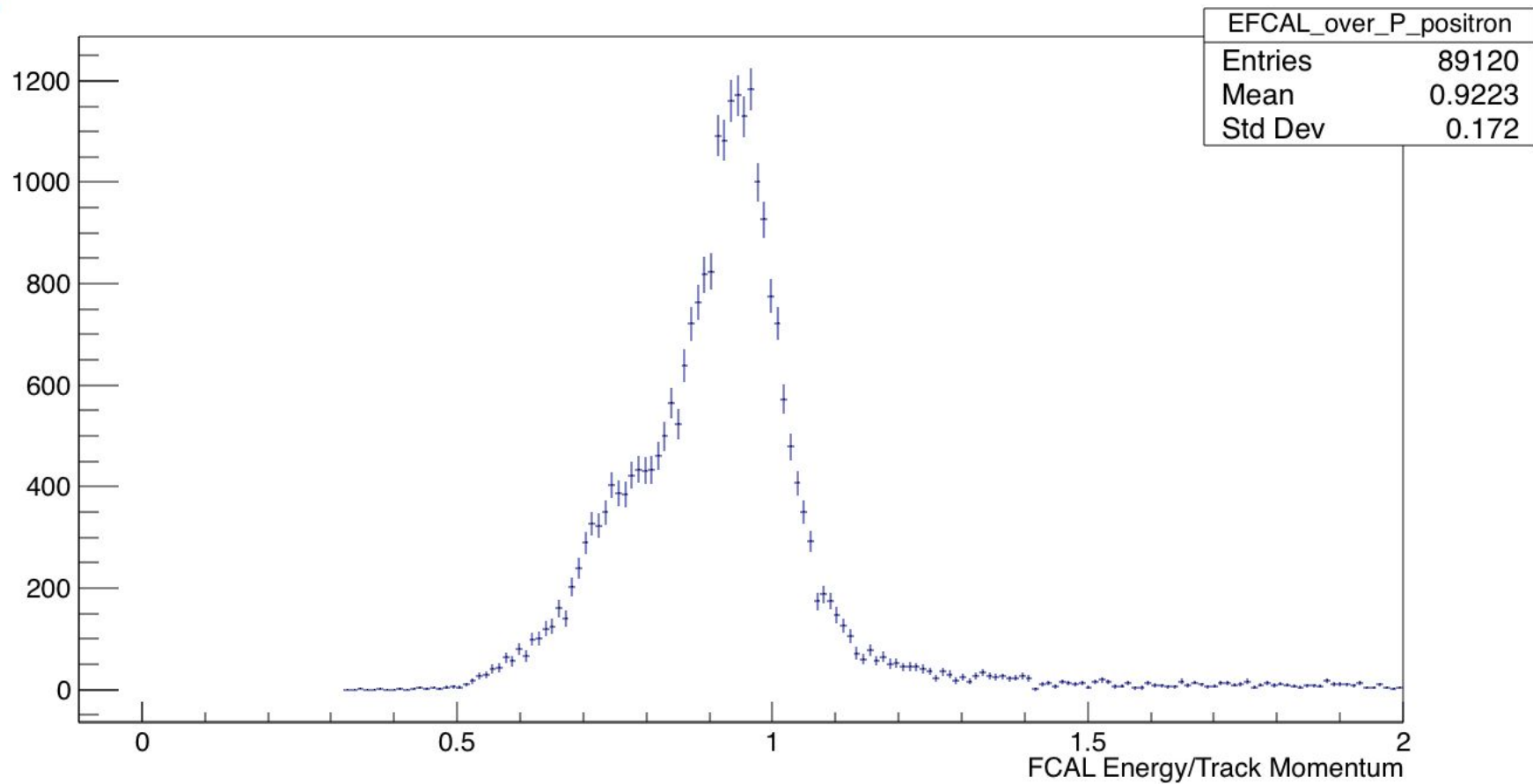


GF

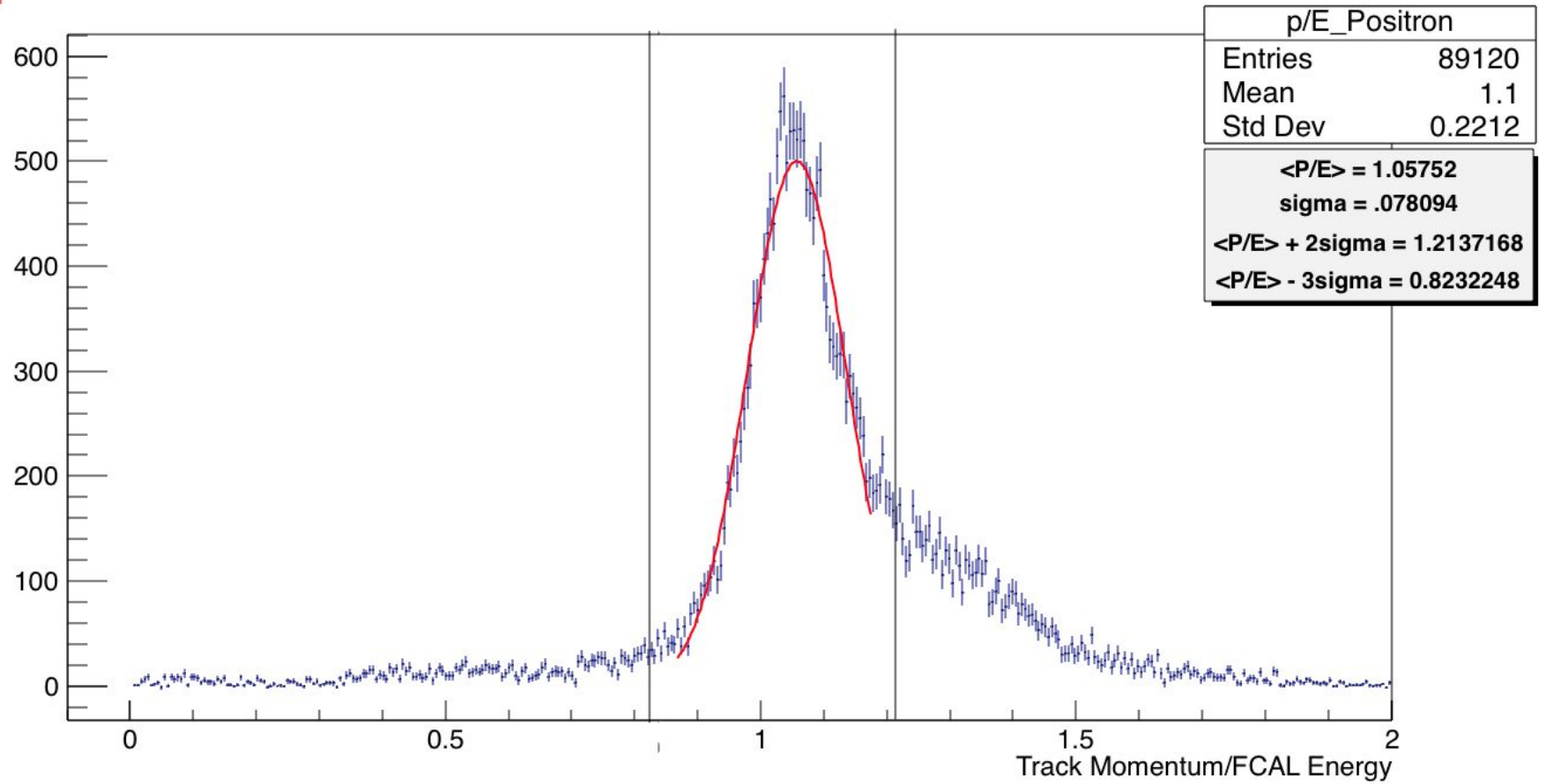




GF

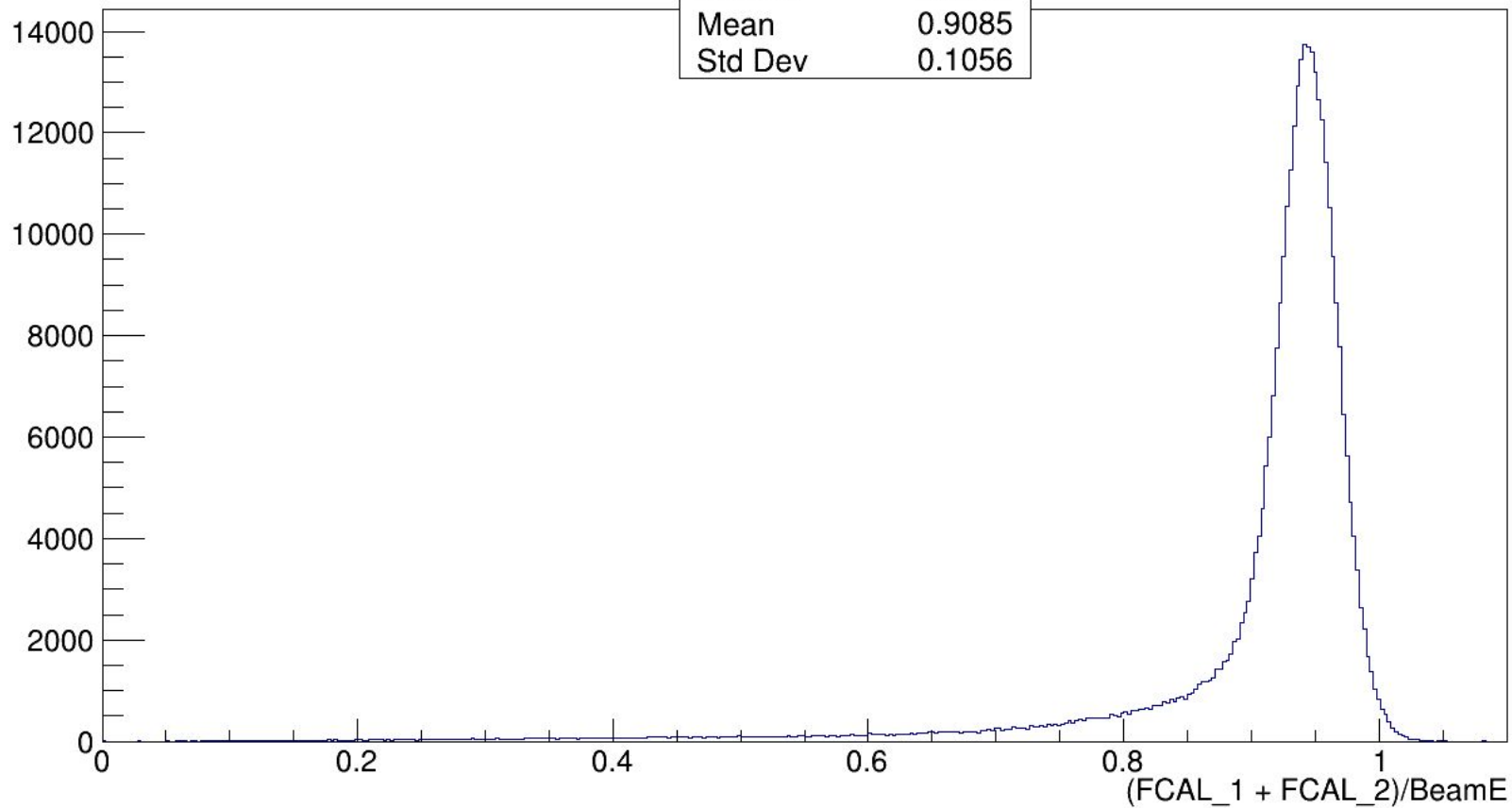


GF



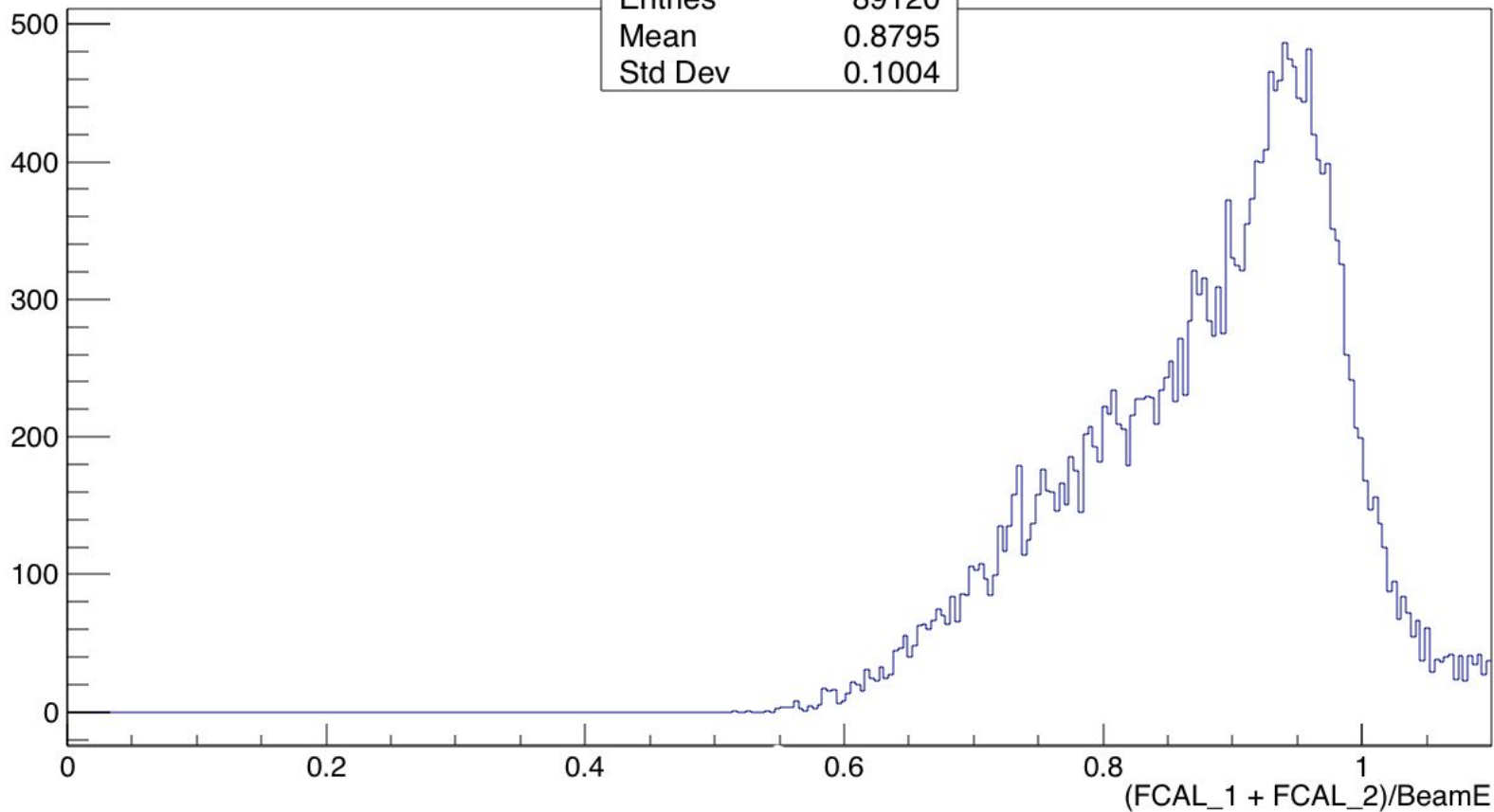
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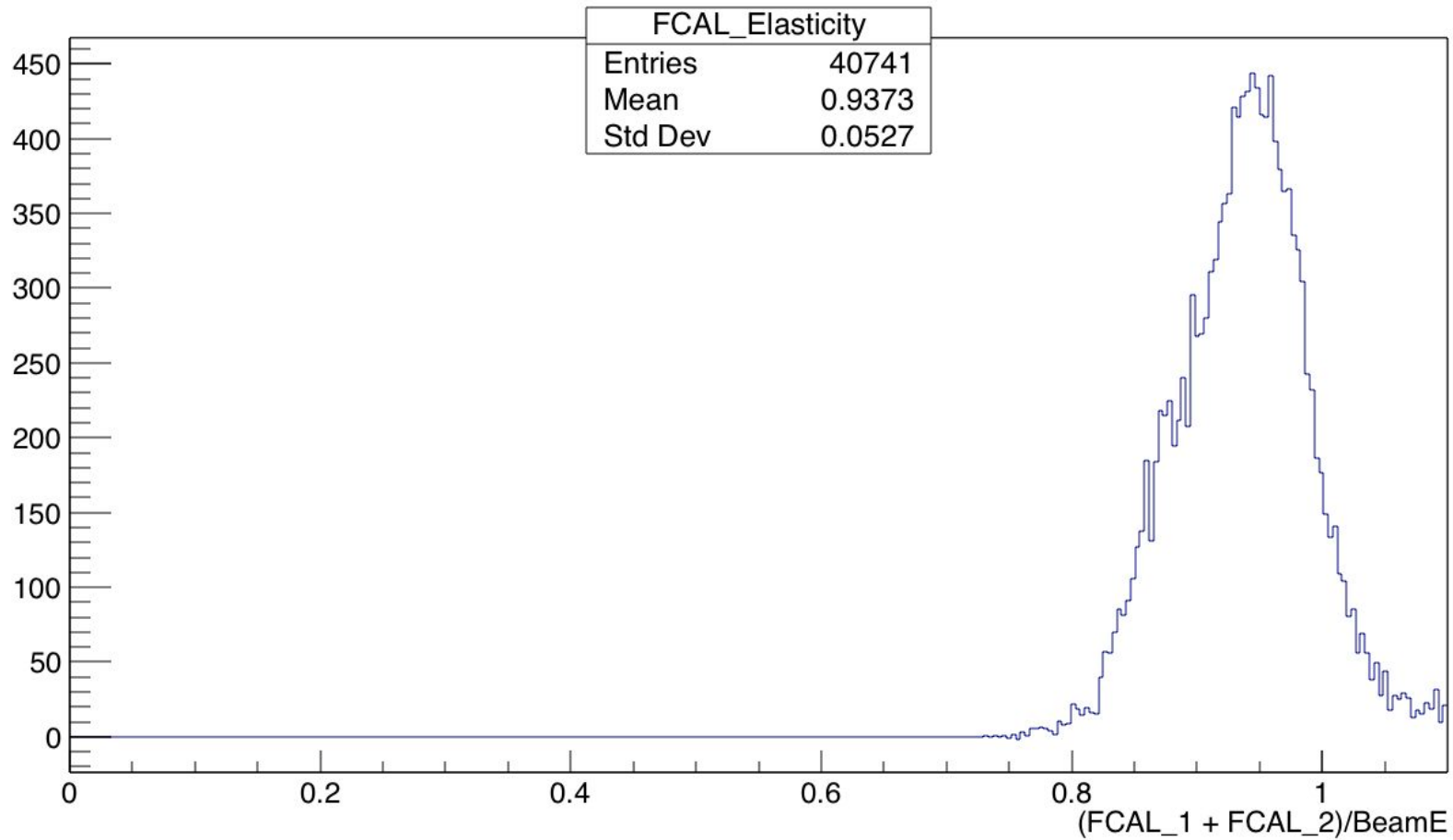


GF

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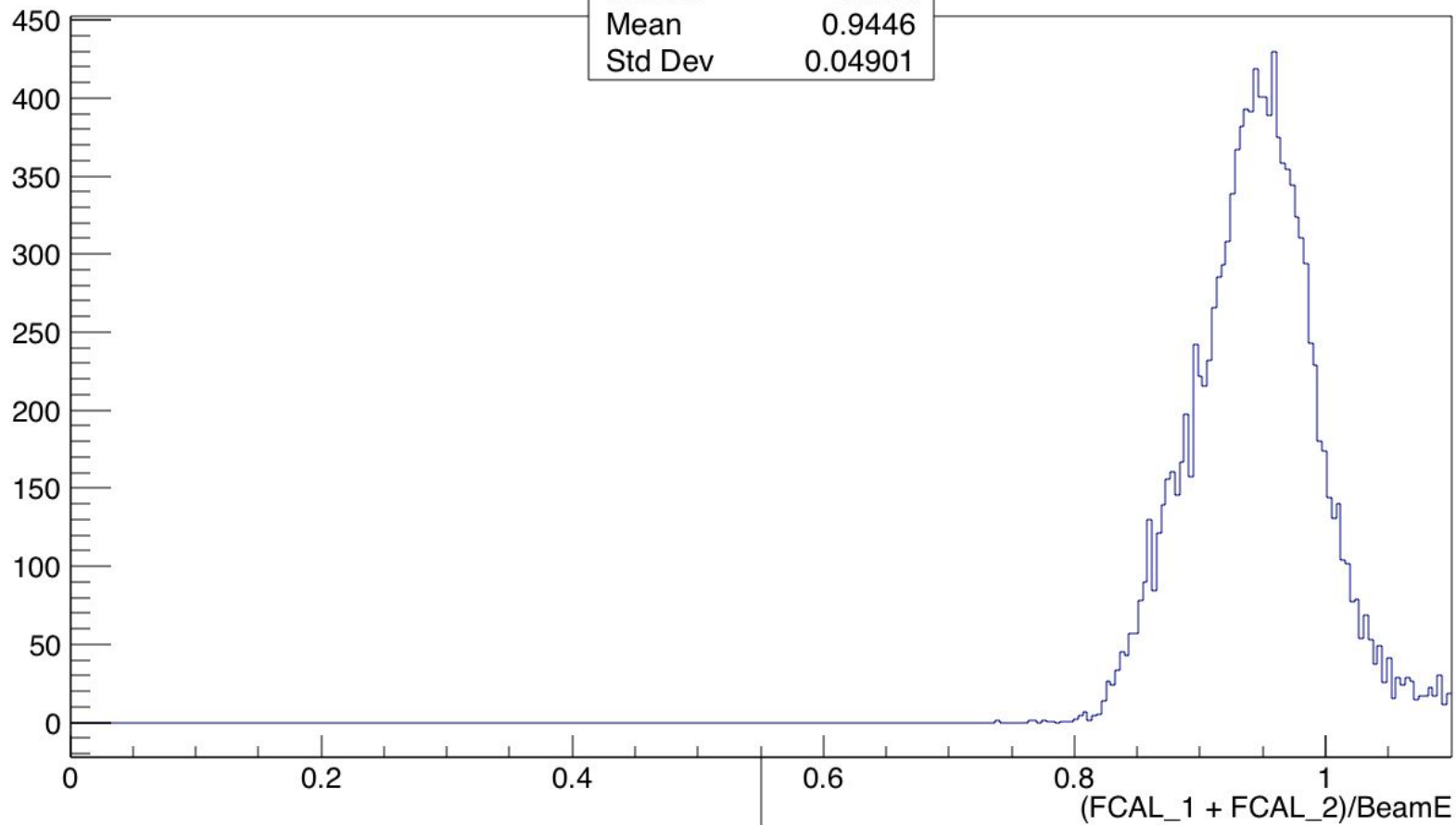


LC

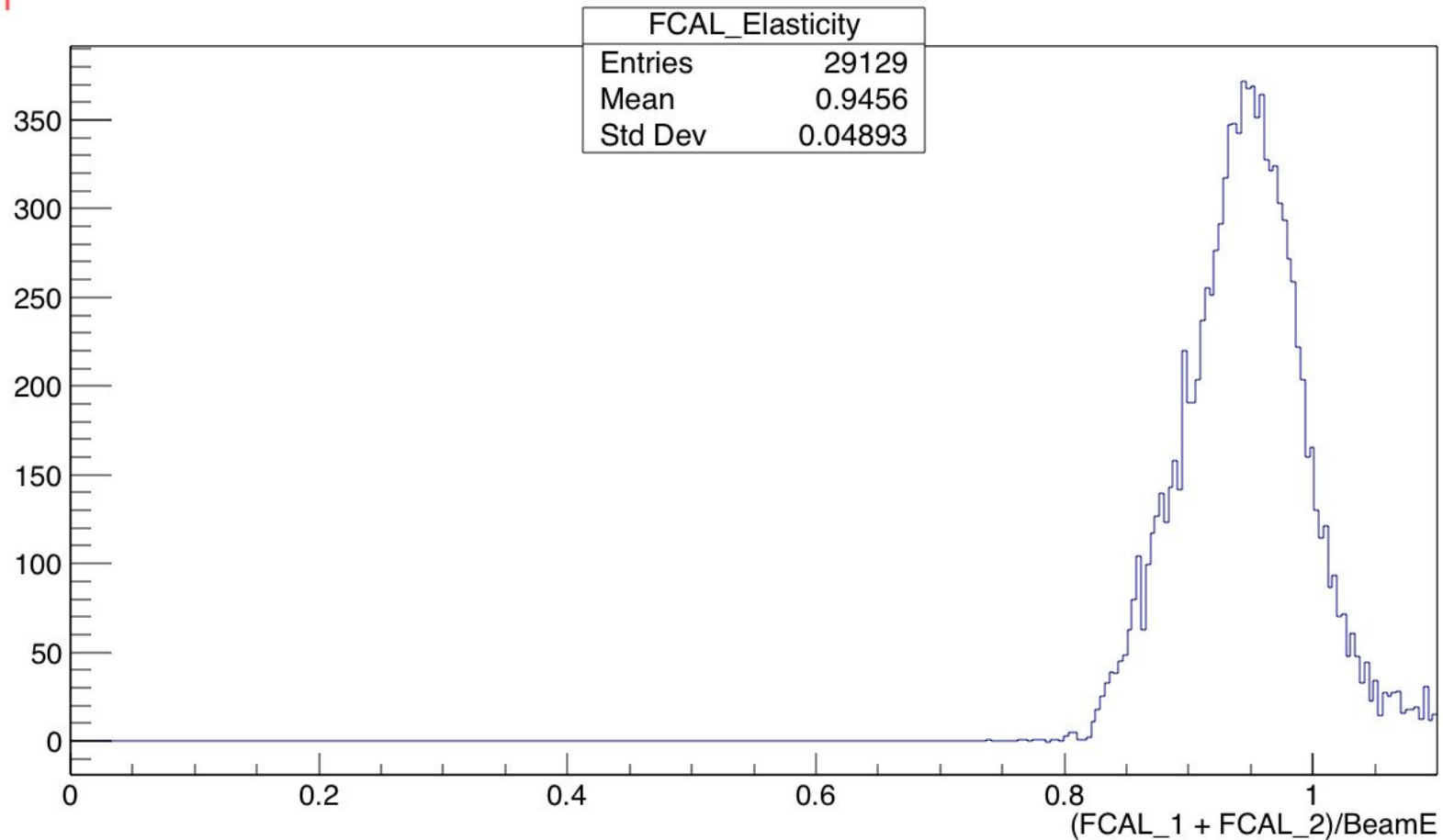
 $-3\sigma < p/E - \langle p/E \rangle < +2\sigma$  Lubomir's Cut

US

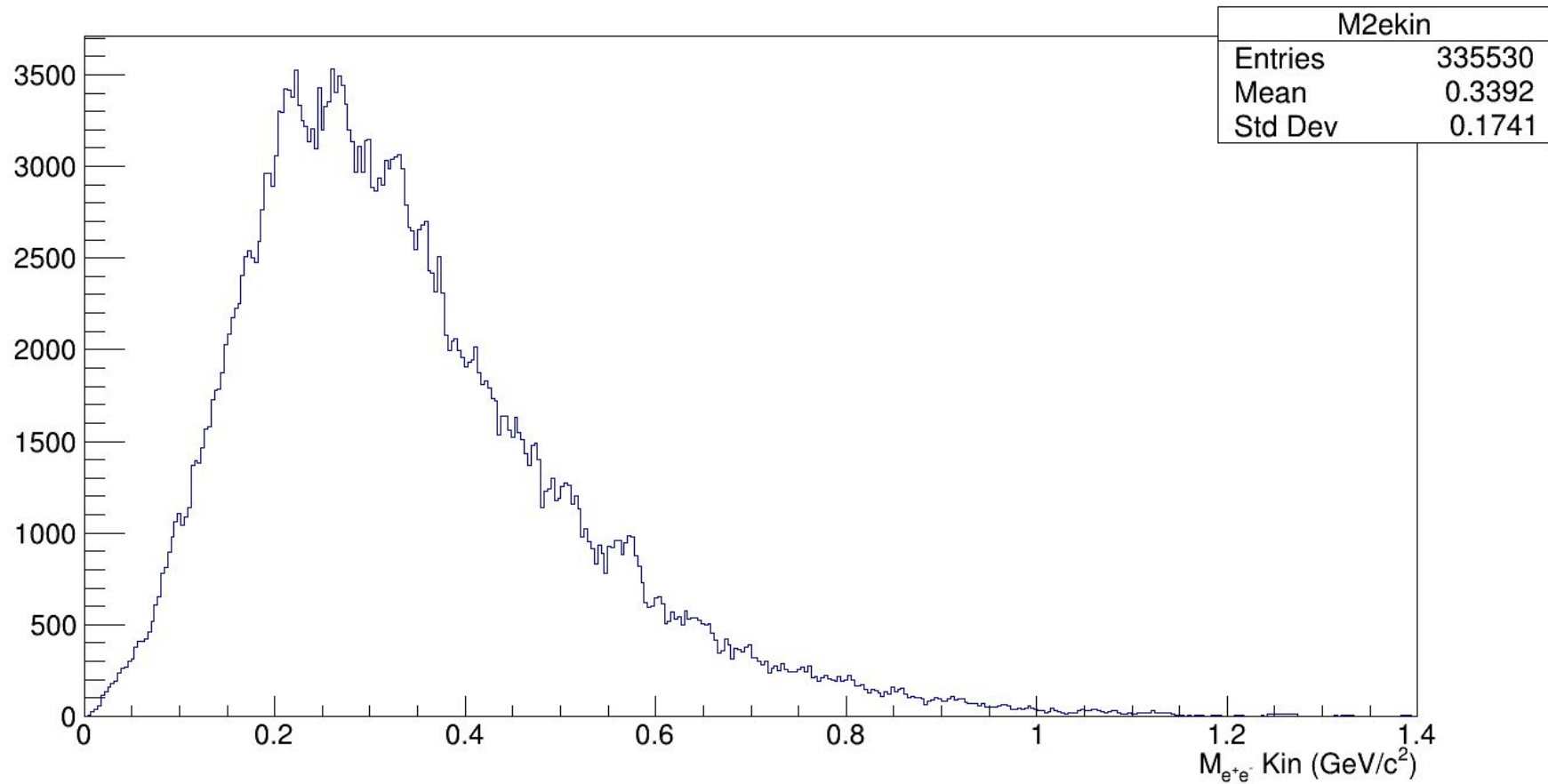
| FCAL_Elasticity |         |
|-----------------|---------|
| Entries         | 34018   |
| Mean            | 0.9446  |
| Std Dev         | 0.04901 |



CL01

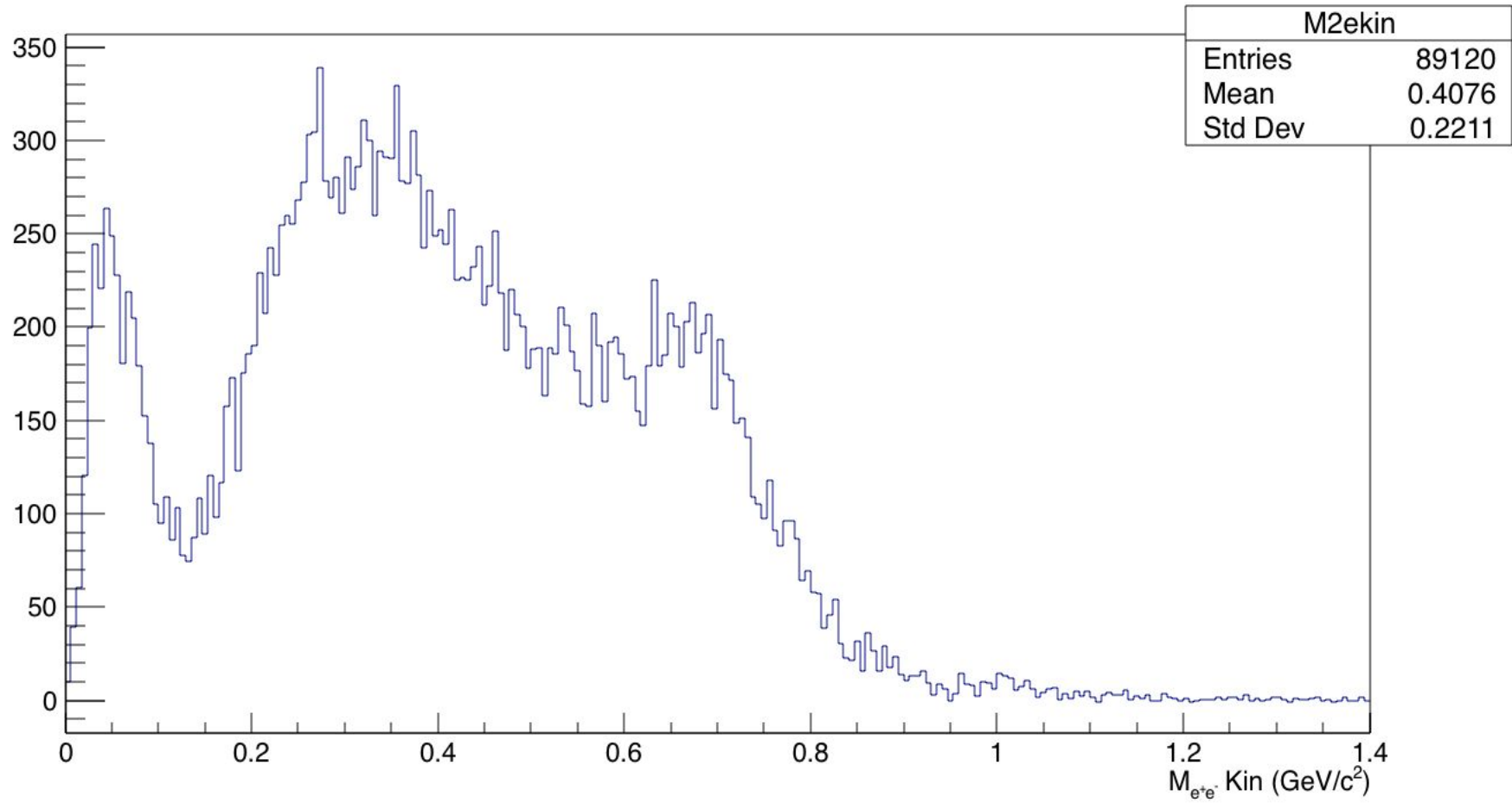


MC

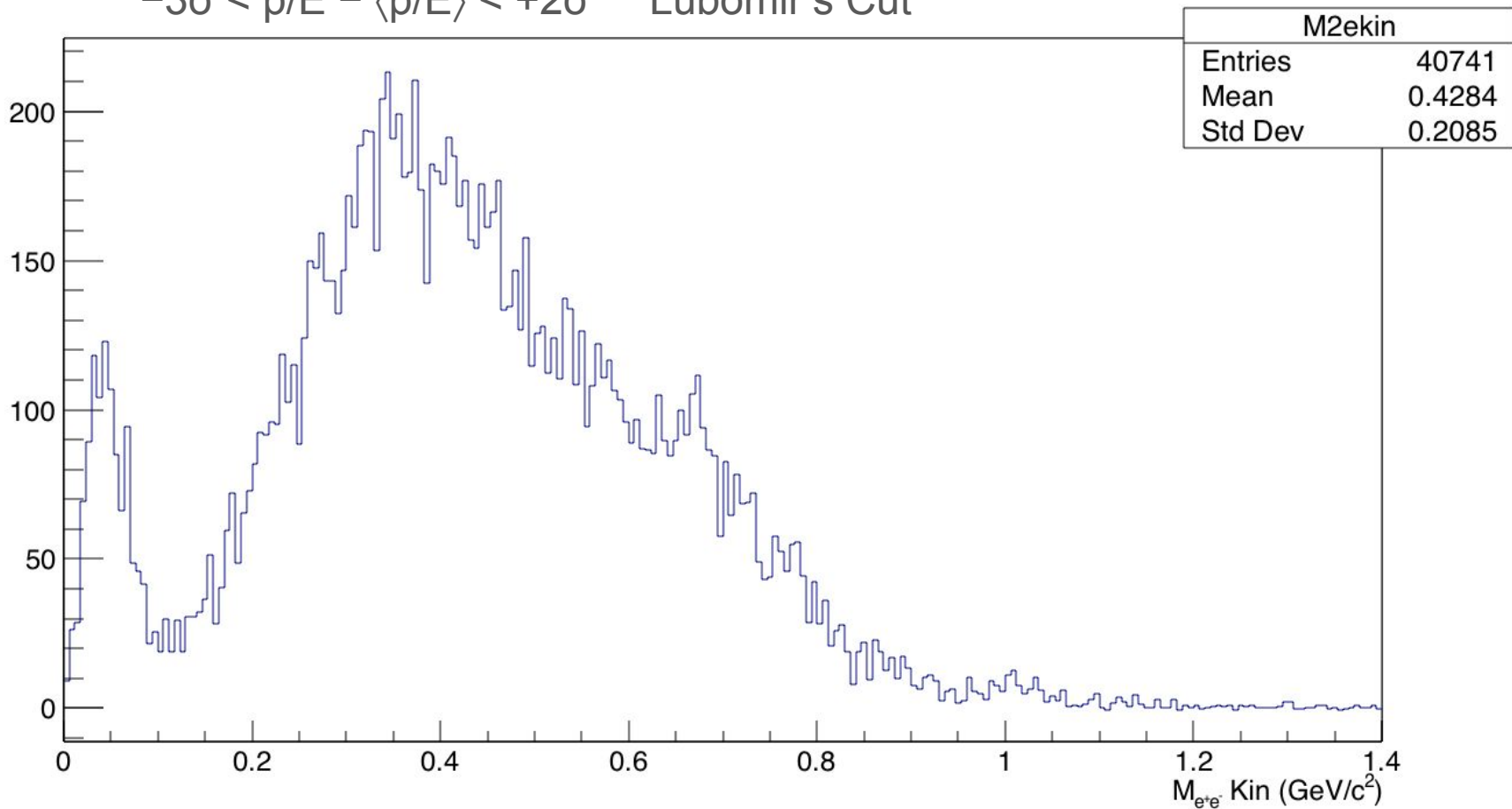




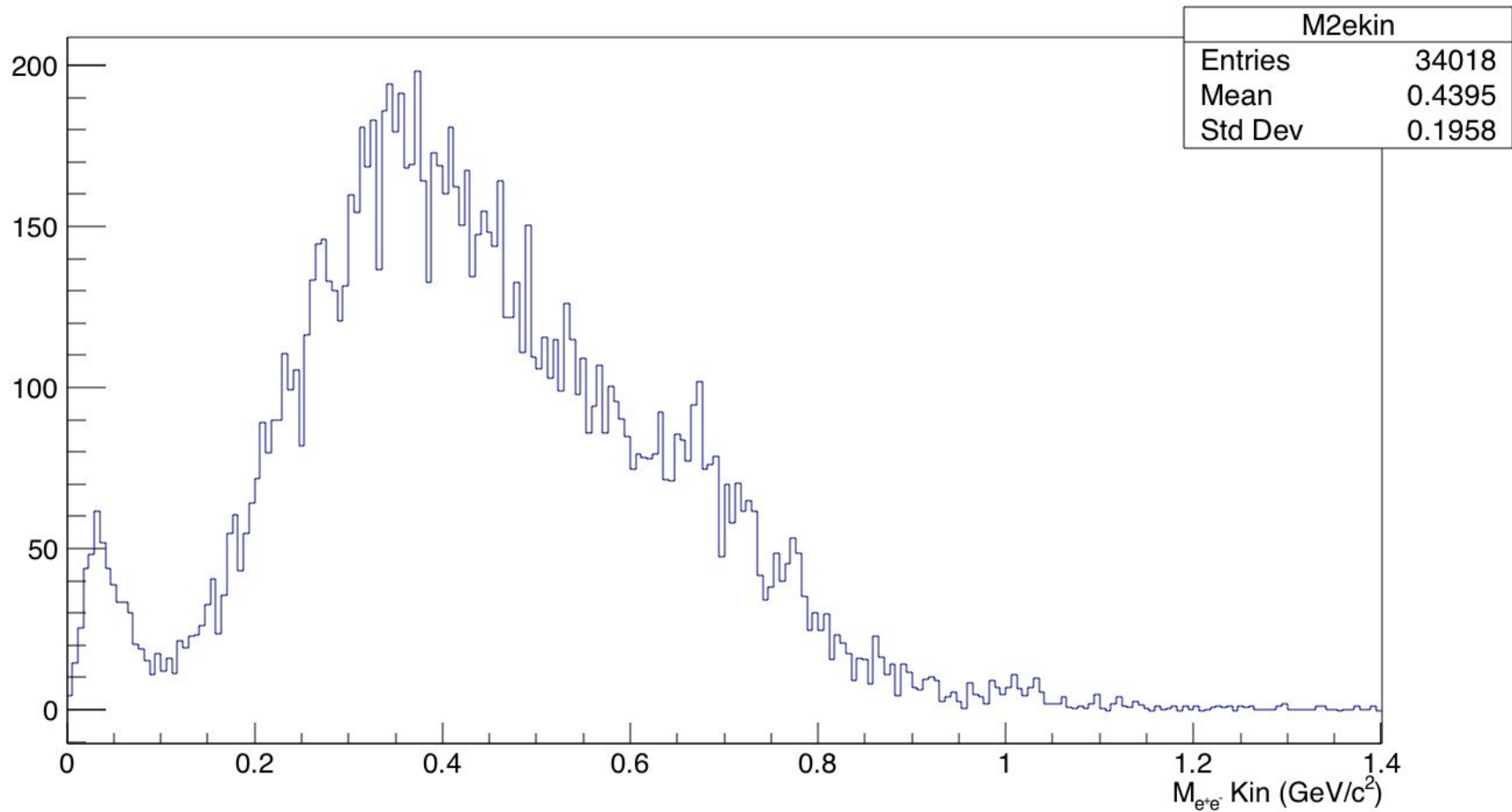
GF



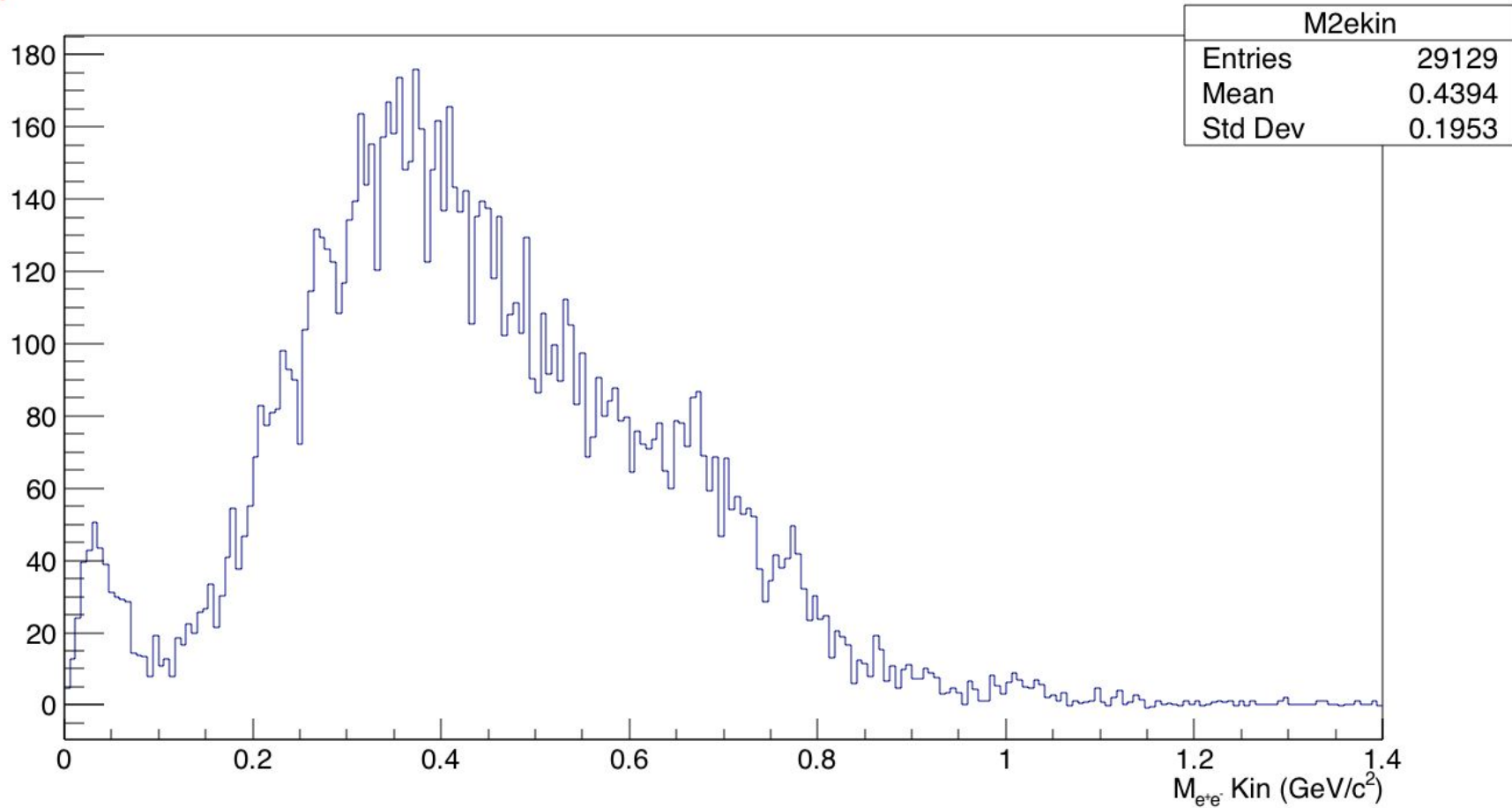
LC

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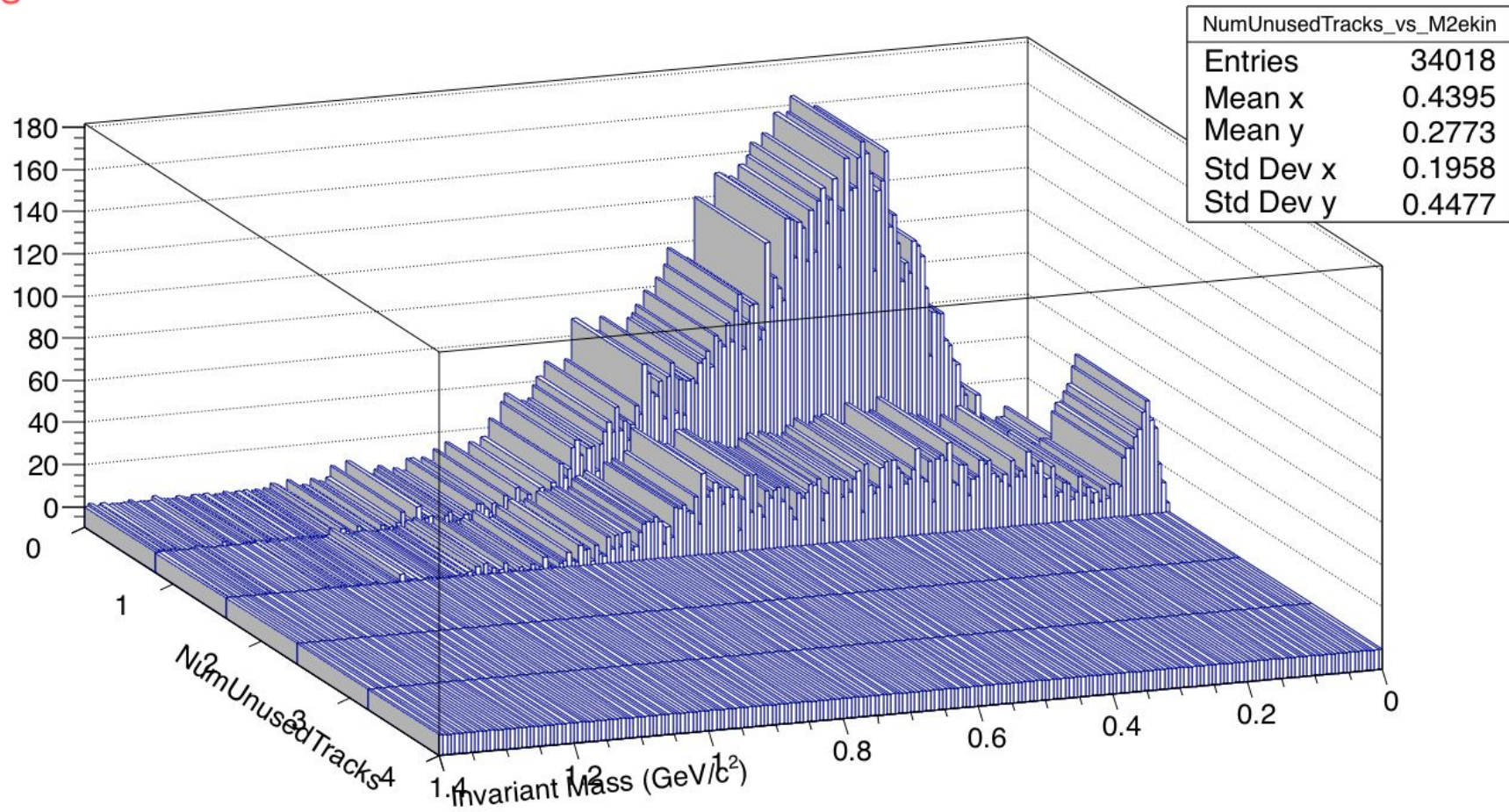
US



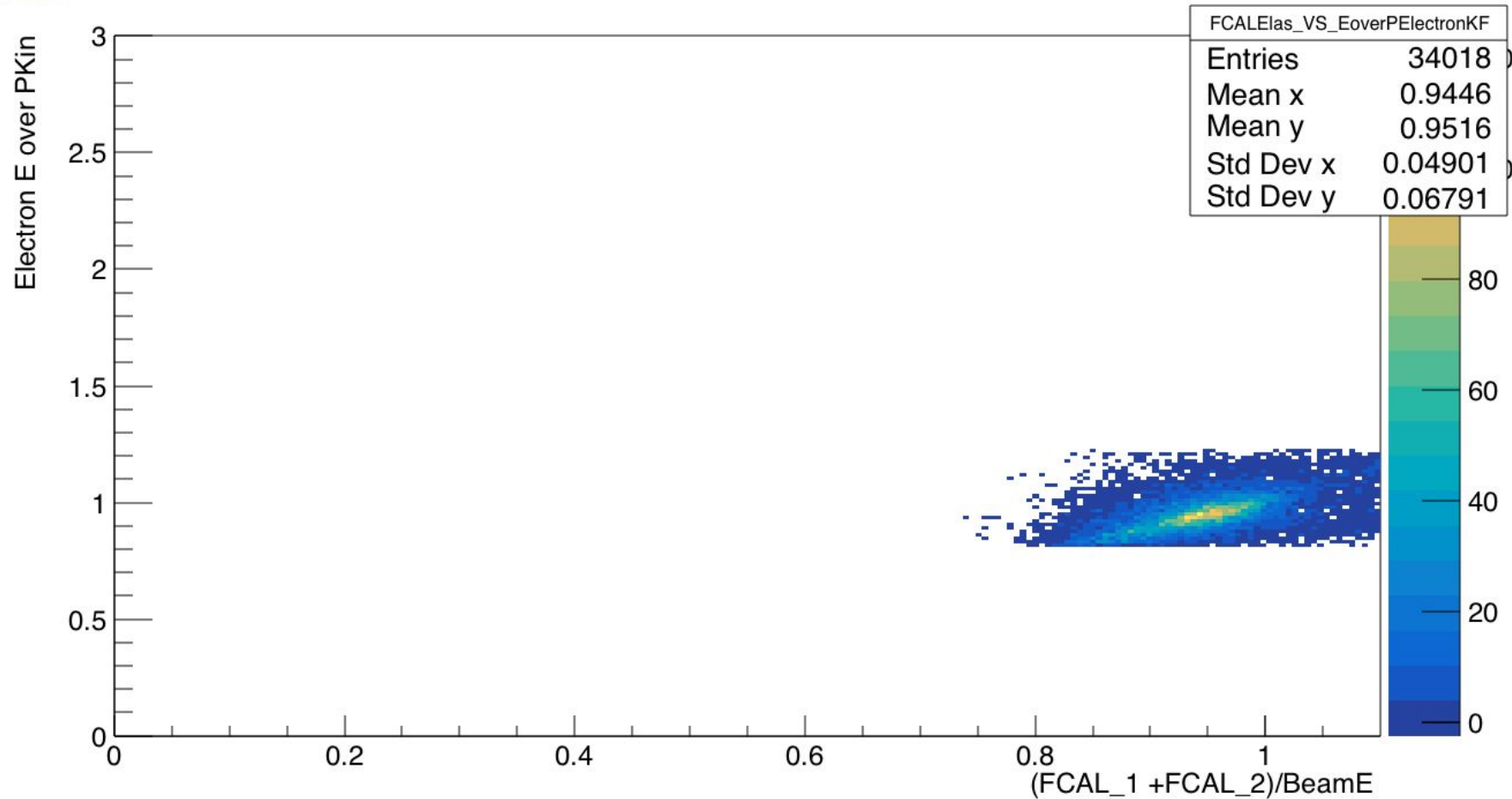
CL01



US



US



# Future Analysis

1. How many times is the proton the Unused Track? (MC Analysis)
2. Fitting E/P vs FCAL Elasticity plot (should switch to P/E to make consistent)
3. Fitting Elasticity in Bins of Invariant Mass

## **New Cut Approach**

1. Only cut on P/E for positron, cut on elasticity, and fit P/E for electron