

# Energy Calibration with ML

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October 22, 2018

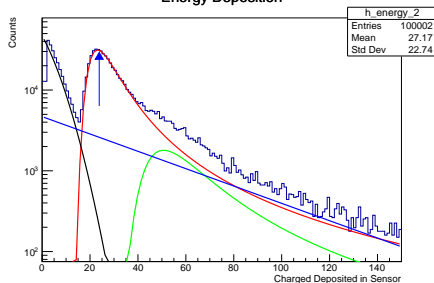
## Energy Calibration

- Sensors in EmCal calibrated by looking for minimum ionizing particles (MIPs)
- Charge deposited by MIPs follows Landau distributions:

$$\text{Signal} = \text{Landau}_0(\mu_0, \sigma_0) + \text{Landau}_1(\mu_1, \sigma_1)$$

- Shown as Red, Green
- Background is composed of a Gaussian pedestal (Black)
  - + high Energy particles (exp, blue), which are signal for analysis, but BG for calibration
- Regression complicated by zero-suppression, which cuts a square notch in a random location between 0 and 10
- Challenge: Fit 200,000 sensors, all with differently shaped signal and background
- Find Most Probable Value ( $\mu$ ) of MIP Landau (Blue Arrow)

Example of charge deposited in single sensor  
Energy Deposition



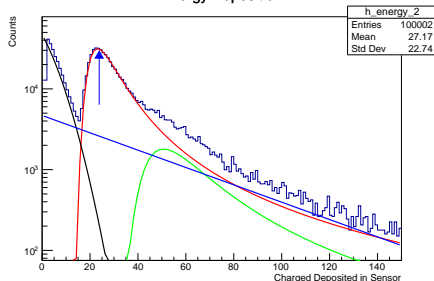
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## Outlook

- Will make additional comparisons between peaks in HIJING and DATA
- Such as hight diffrence between main peaks and subpeaks