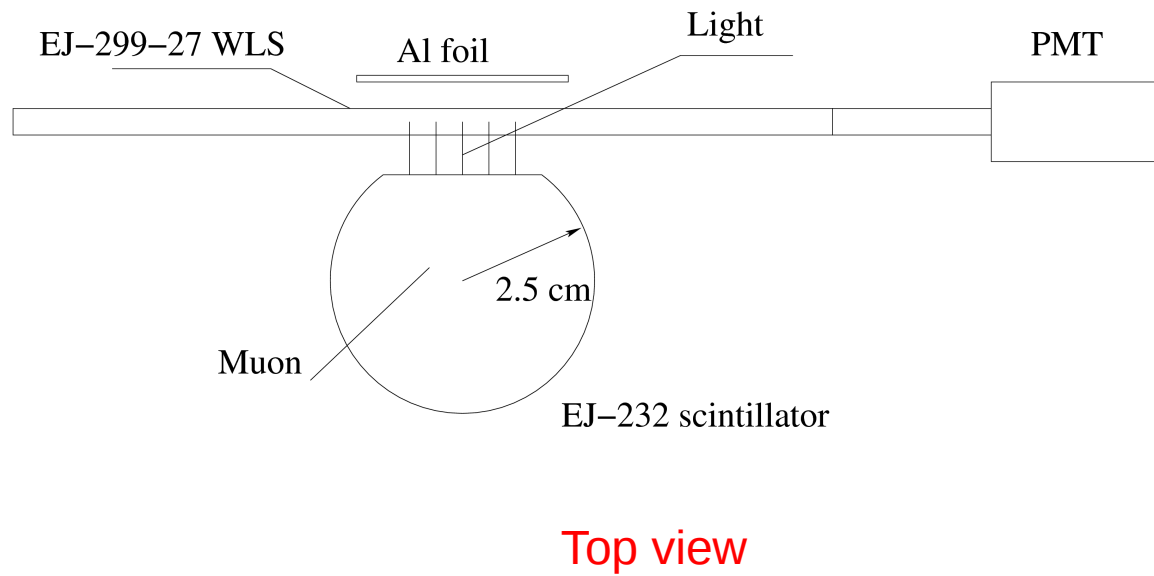
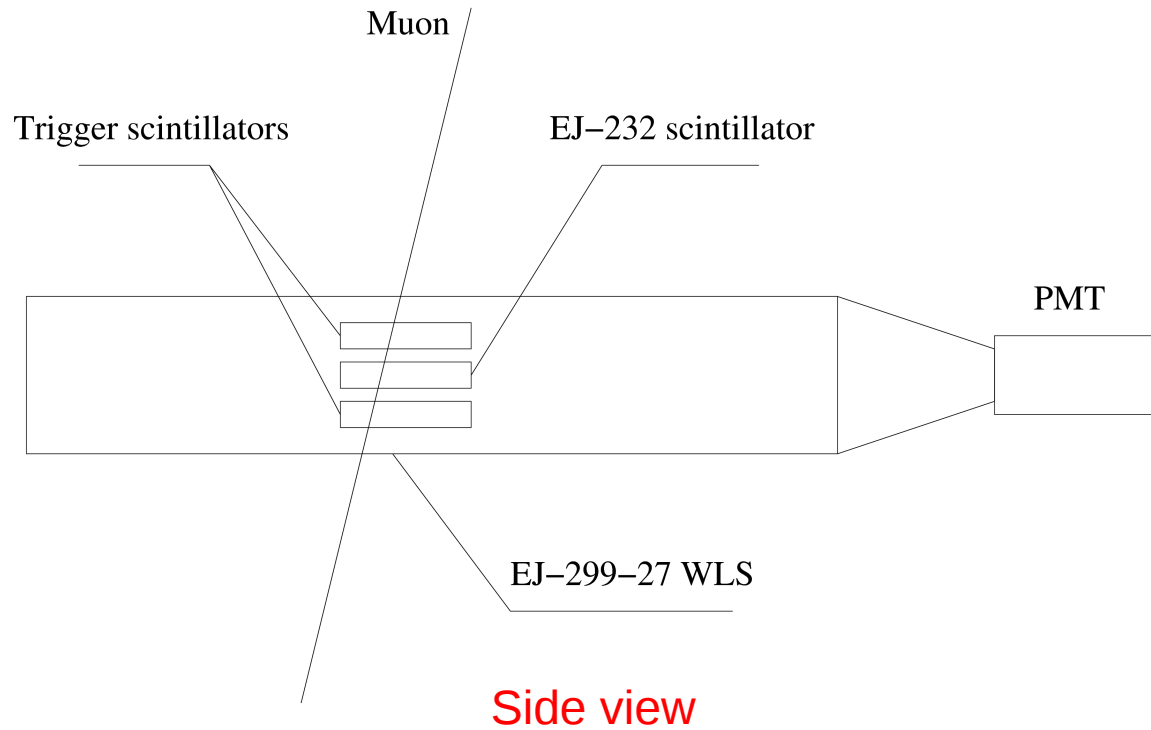


# HCAL Development

Vahe Mamyán  
Carnegie Mellon University

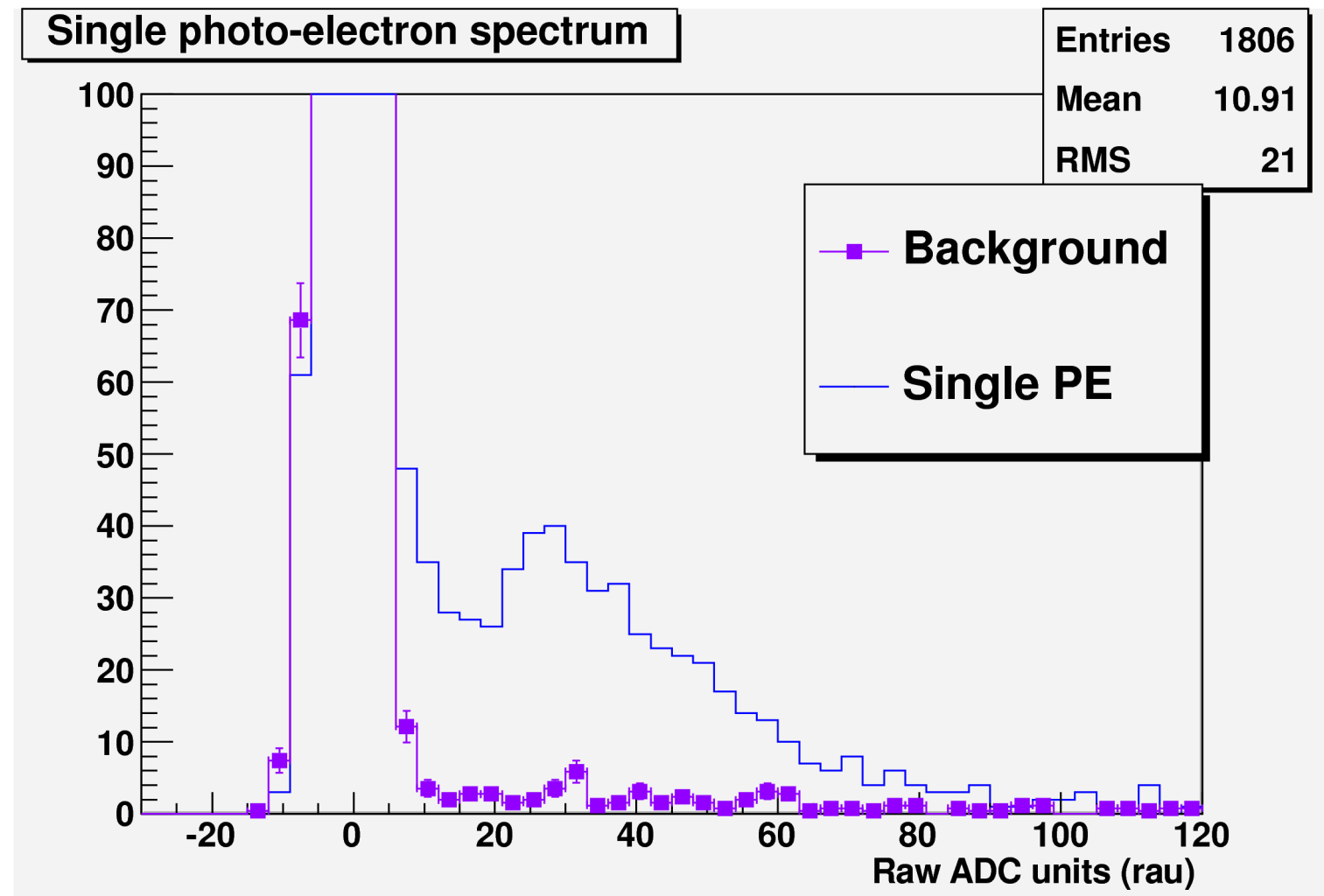
January 23 2013

# Test Setup



# Single Photo-Electron Measurement

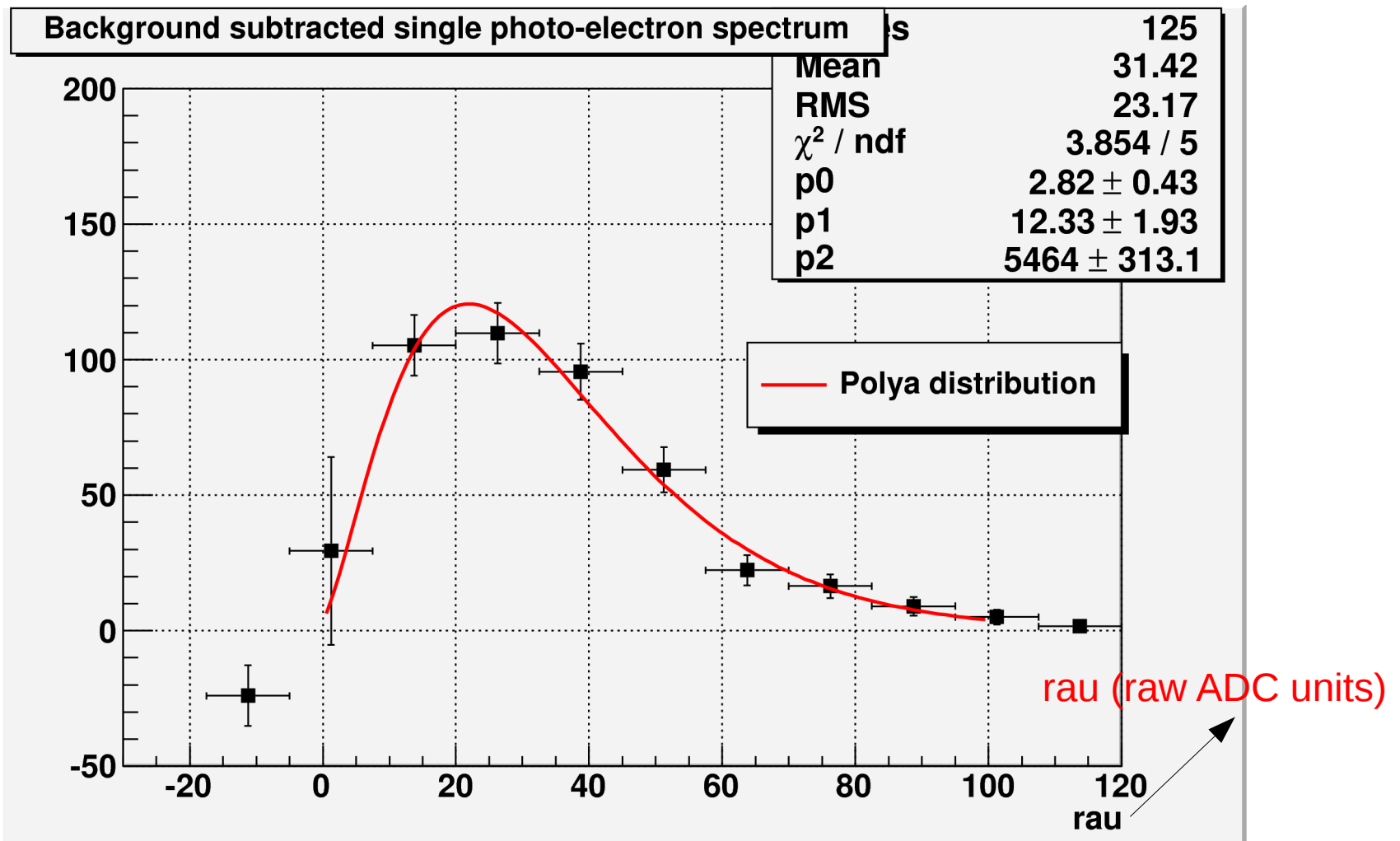
Background is measured with the same setup without the EJ232 scintillator.



# PMT Gain Distribution

PMT gain distribution is obtained by subtracting the background from single photo-electron ADC spectrum.

The PMT gain distribution is fitted with Polya distribution and used to find number of photo-electrons.

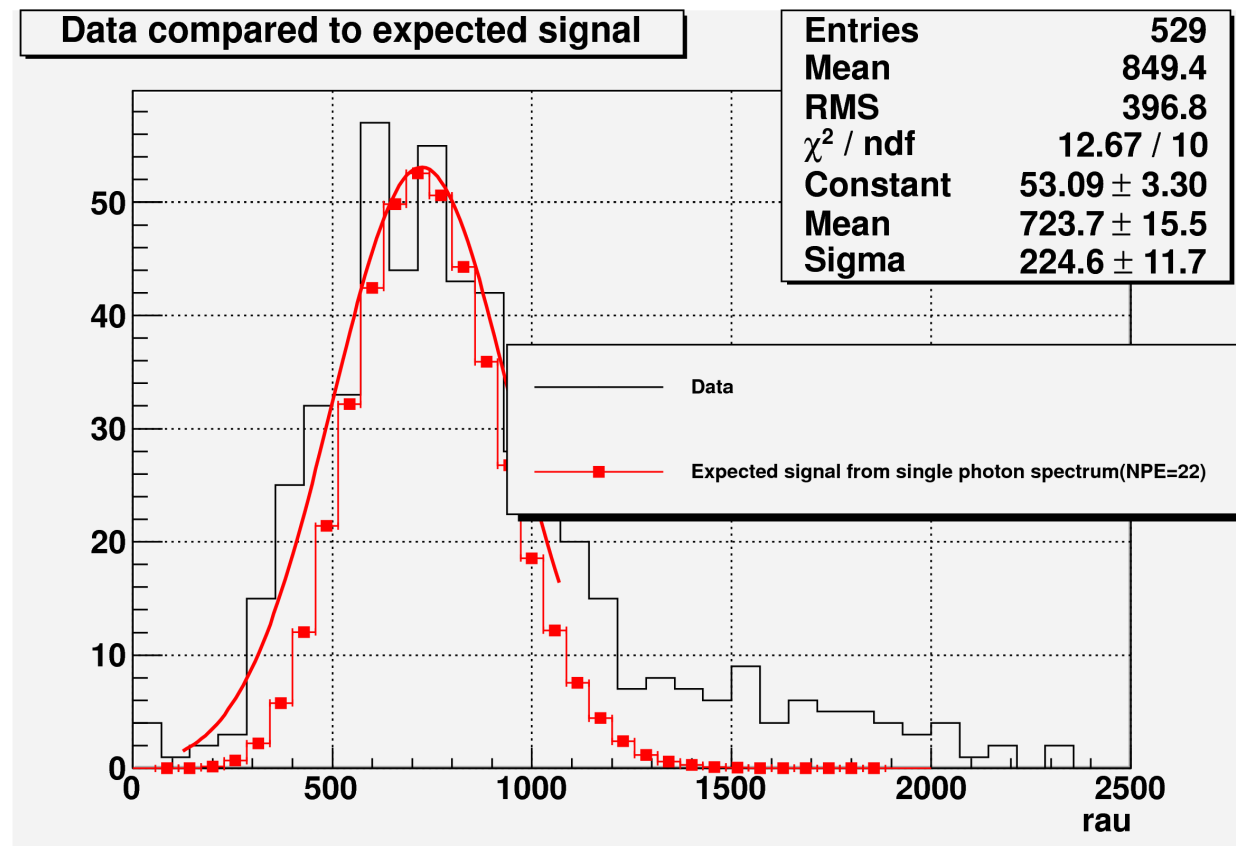


# Number of Photo-Electrons

Use gain distribution to generate expected ADC signal

Assume Poisson statistics

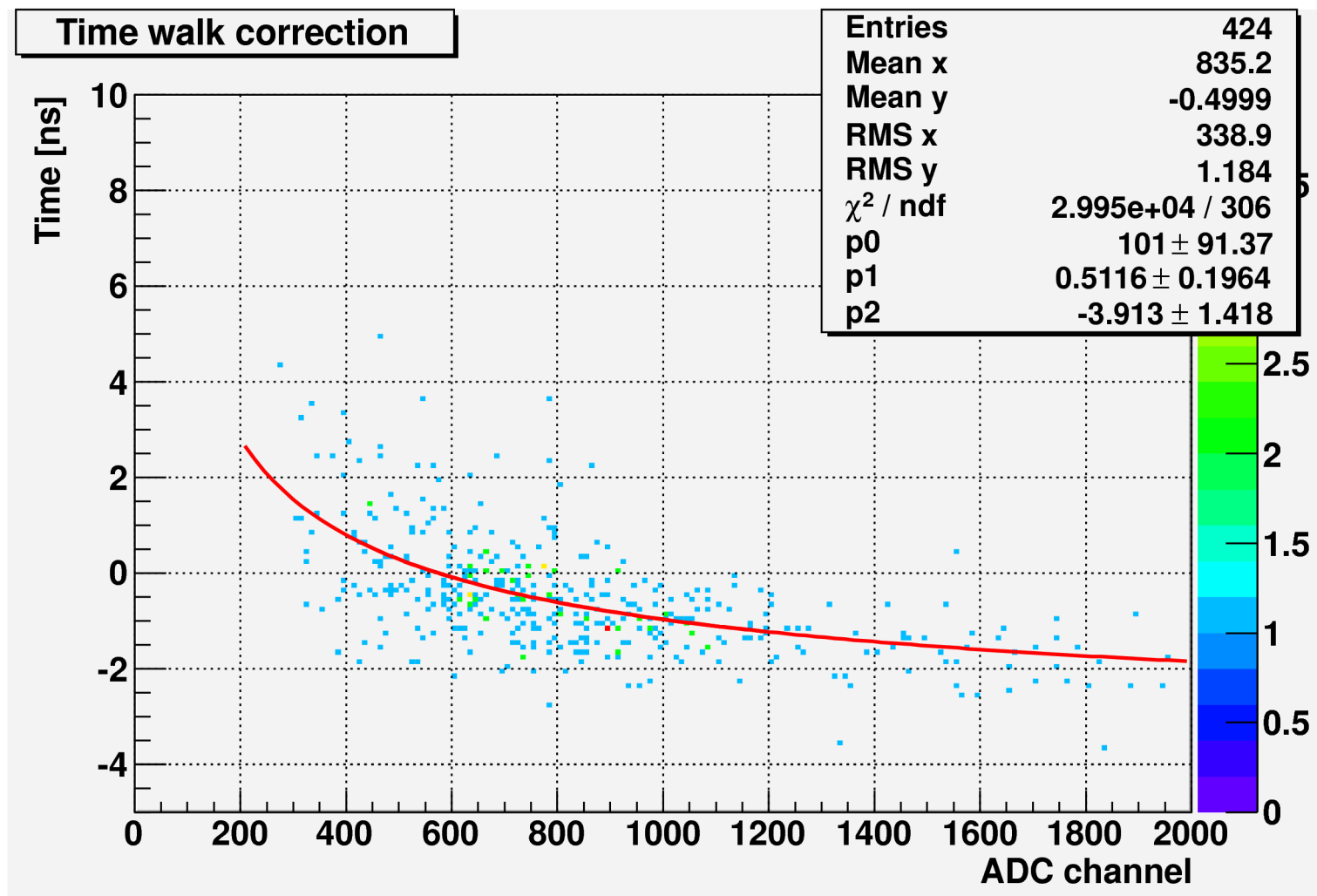
Adjust number of PHE to match the observed ADC distribution



# Time Walk Correction

The signal strength vs time is fitted with function

$$F(A) = P_0 / \text{ADC}^{P_1} + P_2 .$$



# Time Resolution

Trigger scintillators have 0.135 ns hit time resolution.  
In this test the distance between the EJ232 scintillator and the light guide was 20 cm.

