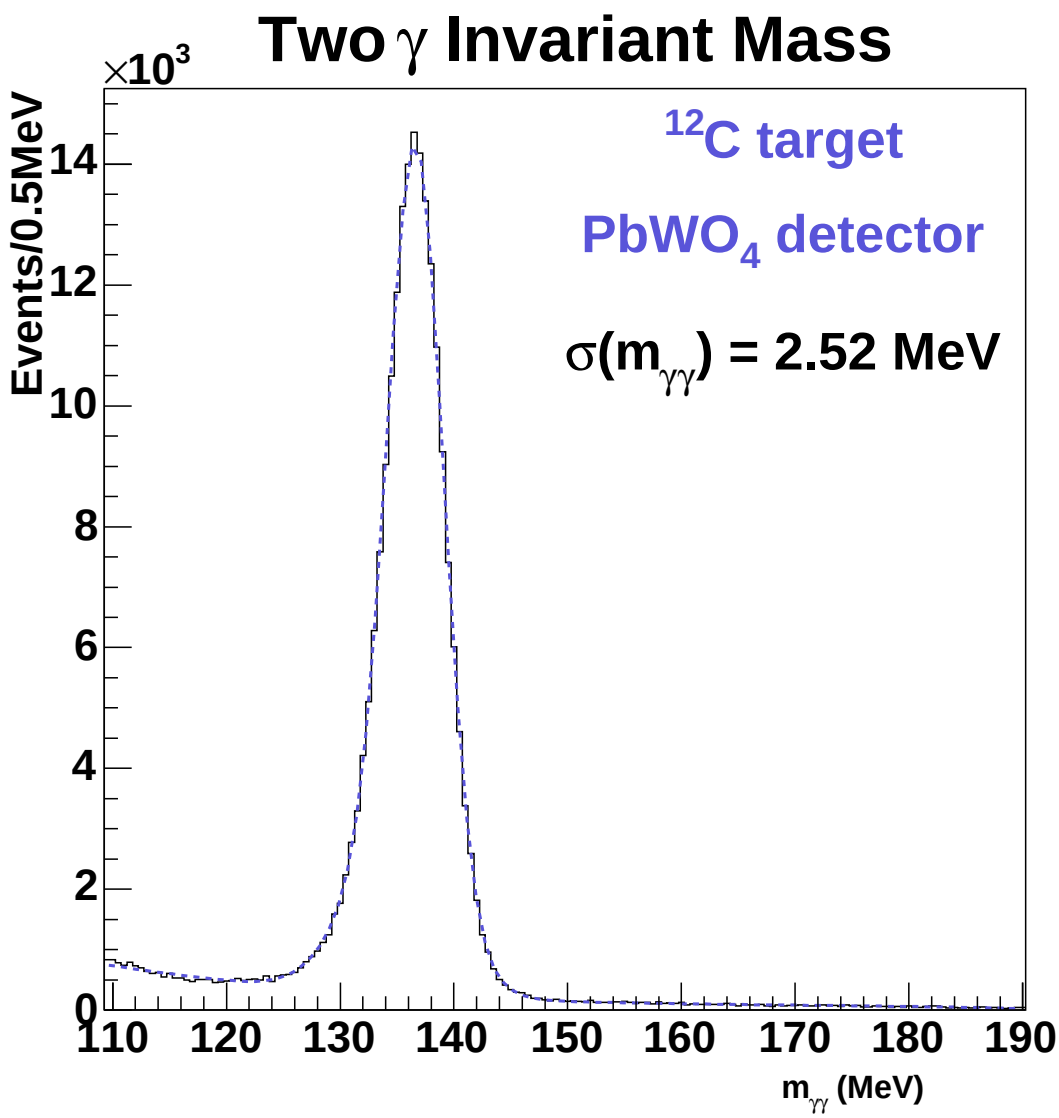
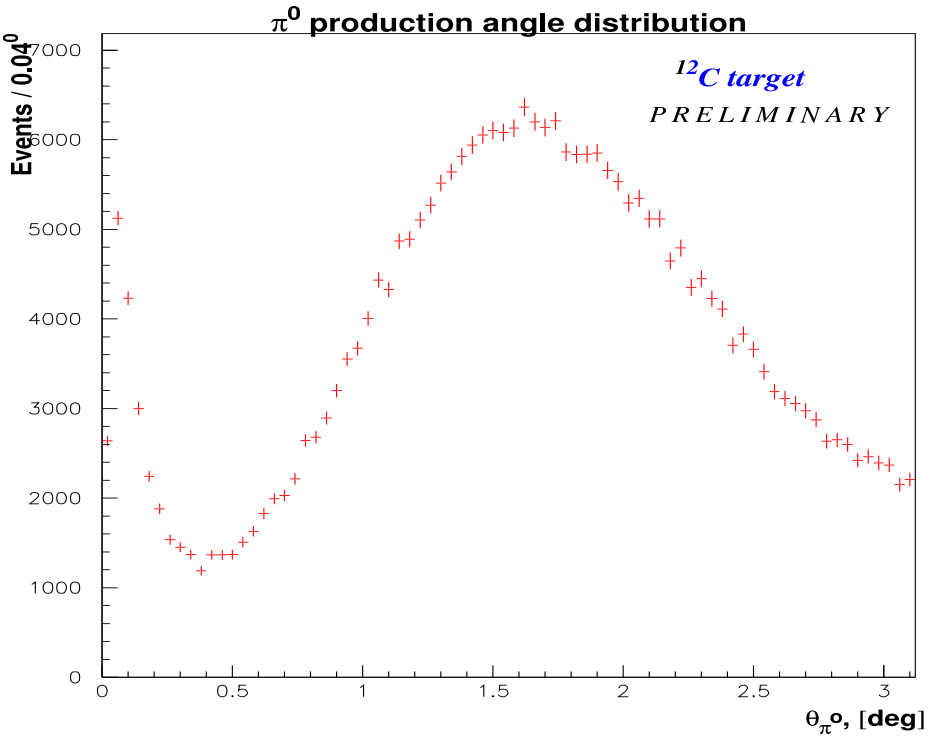
A Precision Measurement of the Neutral Pion Lifetime – the *PrimEx* Experiment

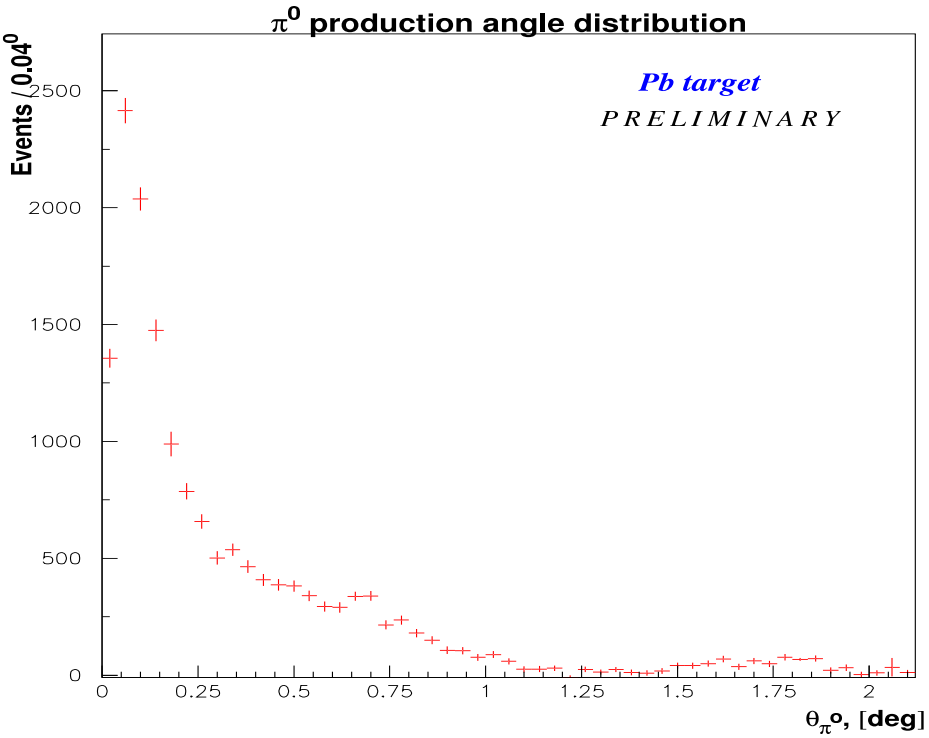
- Constructed a 1728 channel high resolution hybrid calorimeter (HYCAL)
- Hall B photon tagger combined with pair spectrometer to control flux at high intensity

Pion invariant mass resolution in HYCAL



Pion angular distributions

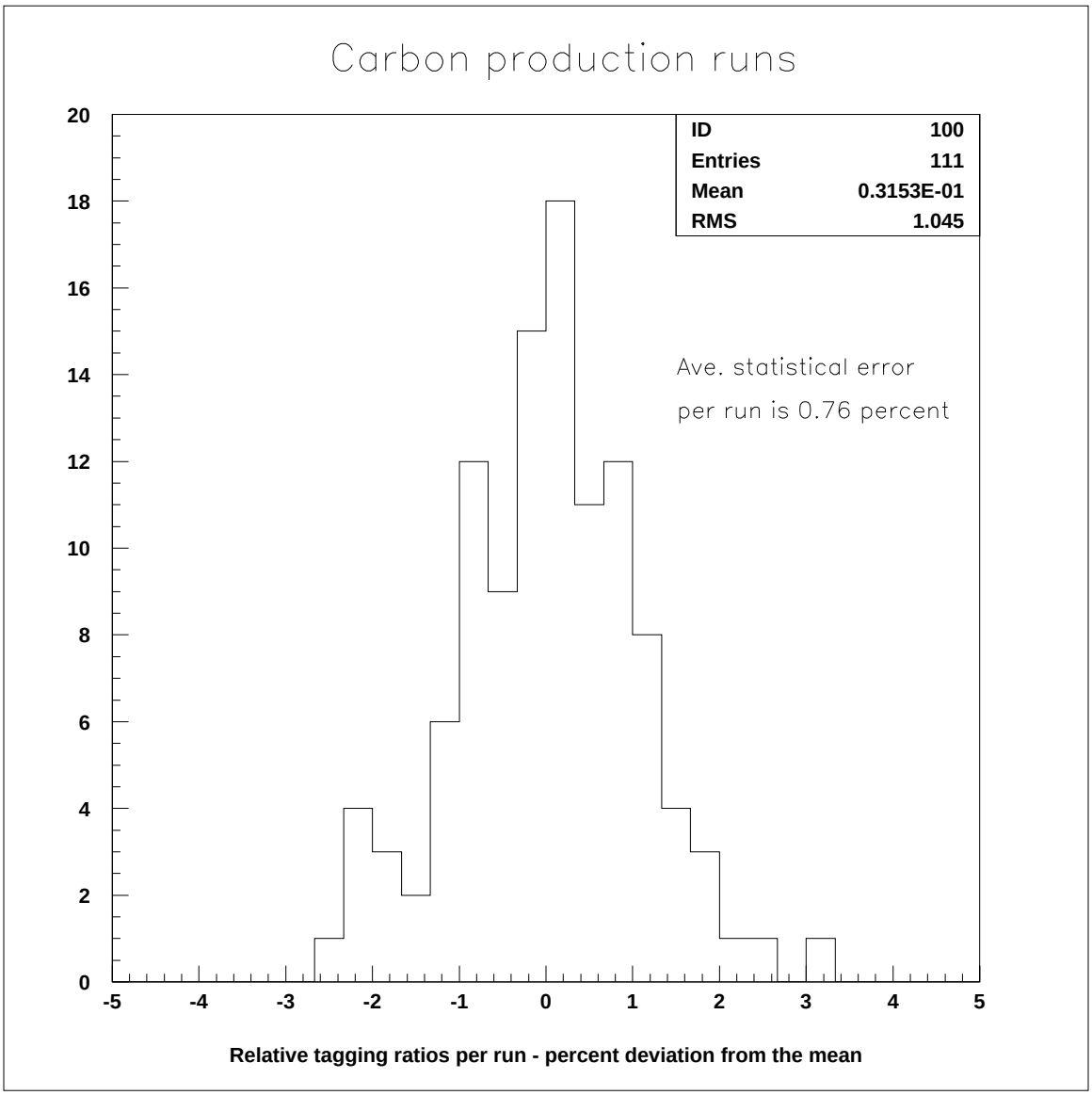




- Clean Primakoff peak, low background
- Nuclear coherent: well resolved in carbon, suppressed in lead

Luminosity Control

- **Relative tagging ratios as measured by the pair spectrometer and tagger, $R = \frac{N_{e^+e^-\cdot e_i}}{N_e}$, stable at the 1% level.**



Utilize Compton Scattering for Detector Calibration

- Outgoing electrons and photons co-planar
- Test coordinate reconstruction
- energies known function of angle
- Test energy gain calibration of detector
- Verify ability to measure a predicted cross section (future test)