LEGS

SASY Technical Note # 8

PN L2-11 Gain
M. Lucas
August 27, 1997
Version 1.0

1 Introduction

Initial gain matching for the three PN Bars used in the limited geometry was done at low incident photon energy. Because of differences in the shape between data and MC, the means were equated as a first attempt at calibrating. Data at higher energies were off. I've obtained a wider energy range of π^0 events from Marvin and am examining the peaks.

All data shown in this note are from Run 3854 or Monte Carlo.

2 Data

A set of runs are being analyzed over a limited geometry in an attempt to gain the best possible separation of Compton and π^0 events. These runs come from a period in early April when we were scattering from the proton. The chosen geometry focusses on photons in the middle 9 crystals in the bottom face of the XTAL Box. The corresponding protons are found in bars L2-10 through L2-12. These are the first three full bars above the hole (all three are in the front layer of full bars).

Pulse height spectra have been collected by placing a series of cuts (see tech note 'MC vs. Data Progress') which should limit the energy range of the protons.

Figure 1 shows the individual peaks as a function of tagging counter. The superimposed curve is the result of a Gaussian fit over a limited window. The window was crudely chosen by finding the peak, traversing to first channel below the half-maximum, and then setting the window at peak$\pm$FWHM. This is not always reliable in situations such as this when statistics are low.

The same was done for the Monte Carlo peaks (Figure 2).

These peaks were written to a file. Results of poor fits were discarded, and the peaks from data were plotted against the peaks from Monte Carlo (see Figure 3). The curve is the result of a linear fit.

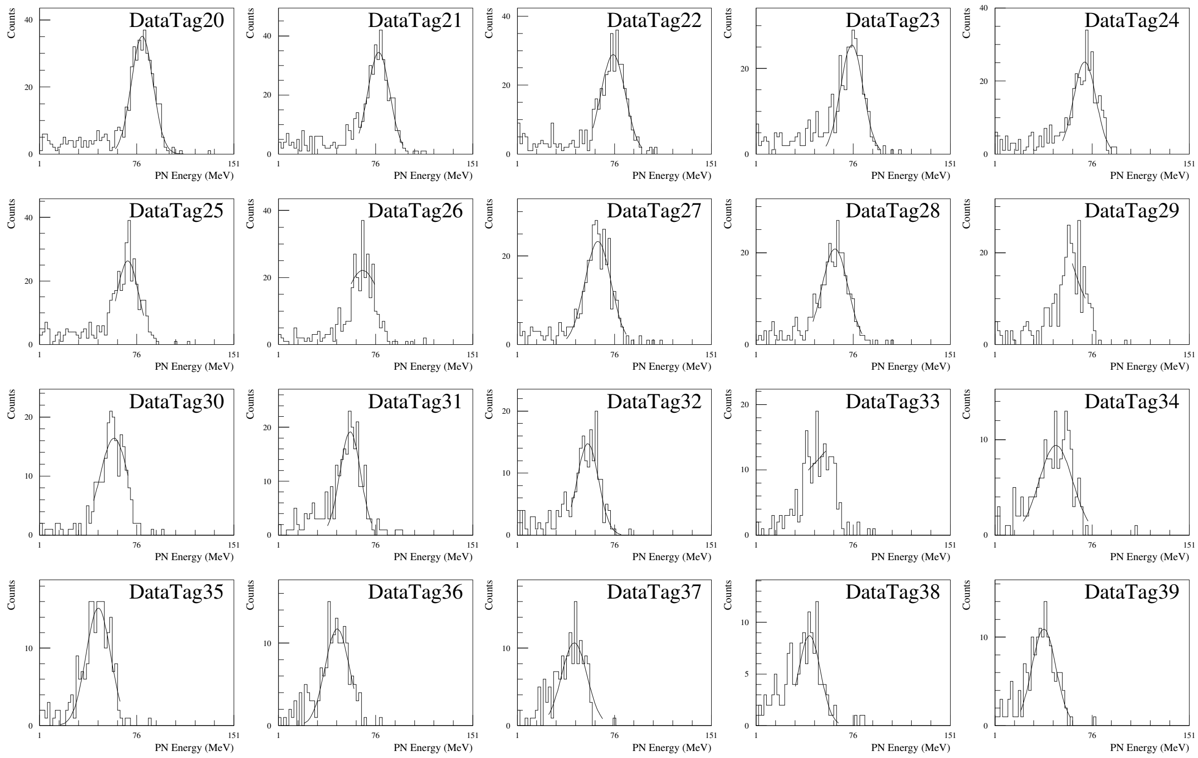

Figure 1: Pulse height spectra from Run 3854 for hits in PN L2-11 given a high energy photon in the central region of the bottom face of the XTAL Box. Each histogram represents a separate tagging bin.

The question at this point is whether the offset is correct (it should pass through 0, but instead passed through -6.6). The gain correction either needs to be the inverse of the slope, or the ratio of MV versus data for a point on the high end of the curve. If 70 MeV is chosen, the correction factor should be 0.820.

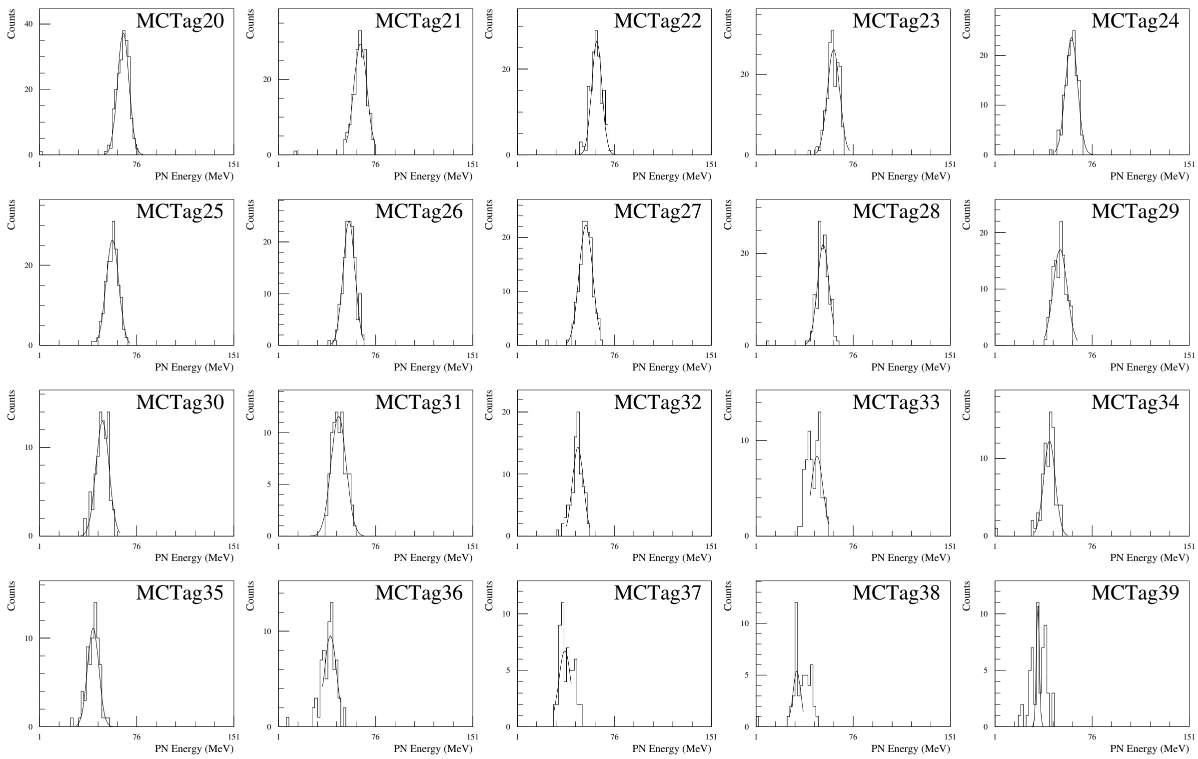

Figure 2: Pulse height spectra from Monte Carlo for hits in PN L2-11 given a high energy photon in the central region of the bottom face of the XTAL Box. Each histogram represents a separate tagging bin.

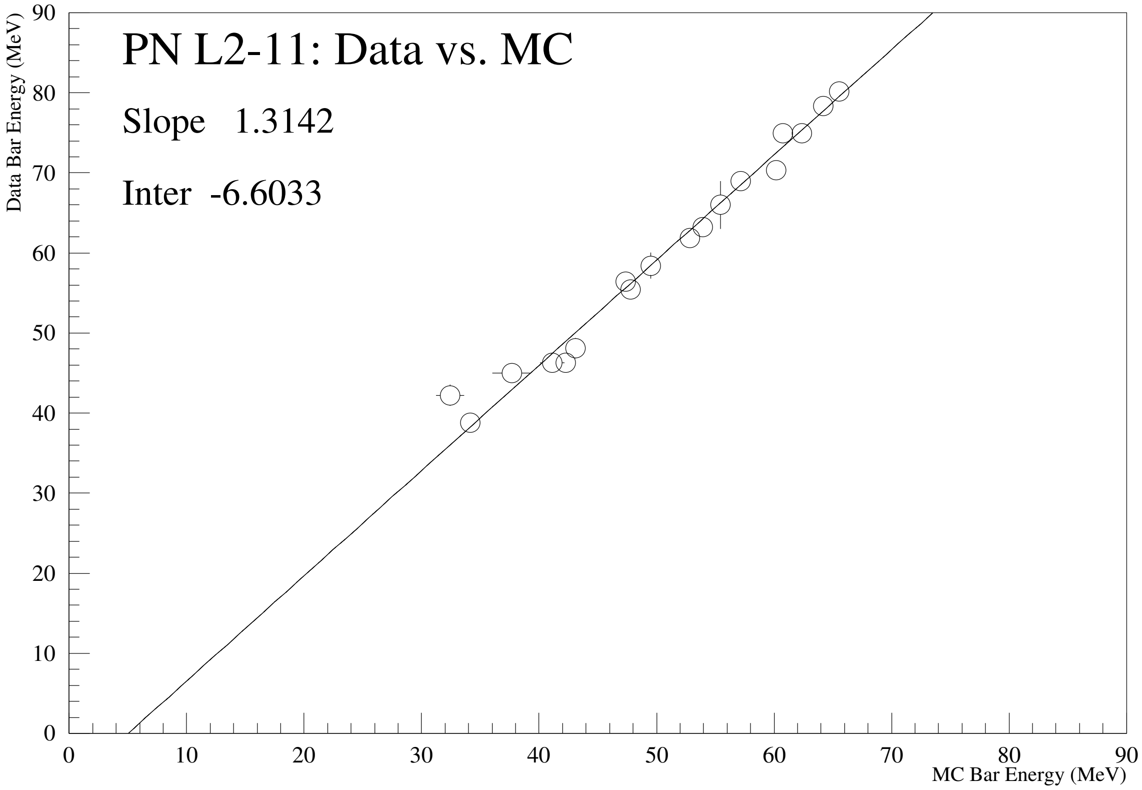

Figure 3: Peak position from data plotted against MC for PN L2-11. Data was 'calibrated' by matching means for low energy protons.