Location and performance of CPVC and DEA

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This document describes the channel assignment, the location and the performance of the CPVC and DEA counters, measured using the 1995 data run 10217. The TeX-formatted Postscript version of this document suitable for printing is *here* <http://lemond.phy.bnl.gov/documentation/detectors/cpvc/cpvc.ps>

Contents

1 Introduction

1.1 Measurement of the counter positions

The location of CPVC and DEA in MPS coordinates was measured by imaging the counter segments using reconstructed charged tracks.

The imaging of the counter segments is done by identifying the events where the charged tracks hit the segment and plotting the X and Y track positions on the face of the counter.

The events where the tracks hit the counter are selecting that the ADC signal from the segment is above 1000 ADC counts (typical ADC pedestal is 500 with with width around 10-20 counts). Usually, the image of the counter segment is clearly seen on the resulting X-Y scatter plot. The spacial resolution is limited by the statistics, by the background caused by additional charged tracks present in the events that do not hit the counter segment and by the non-normal incidence of charged tracks.

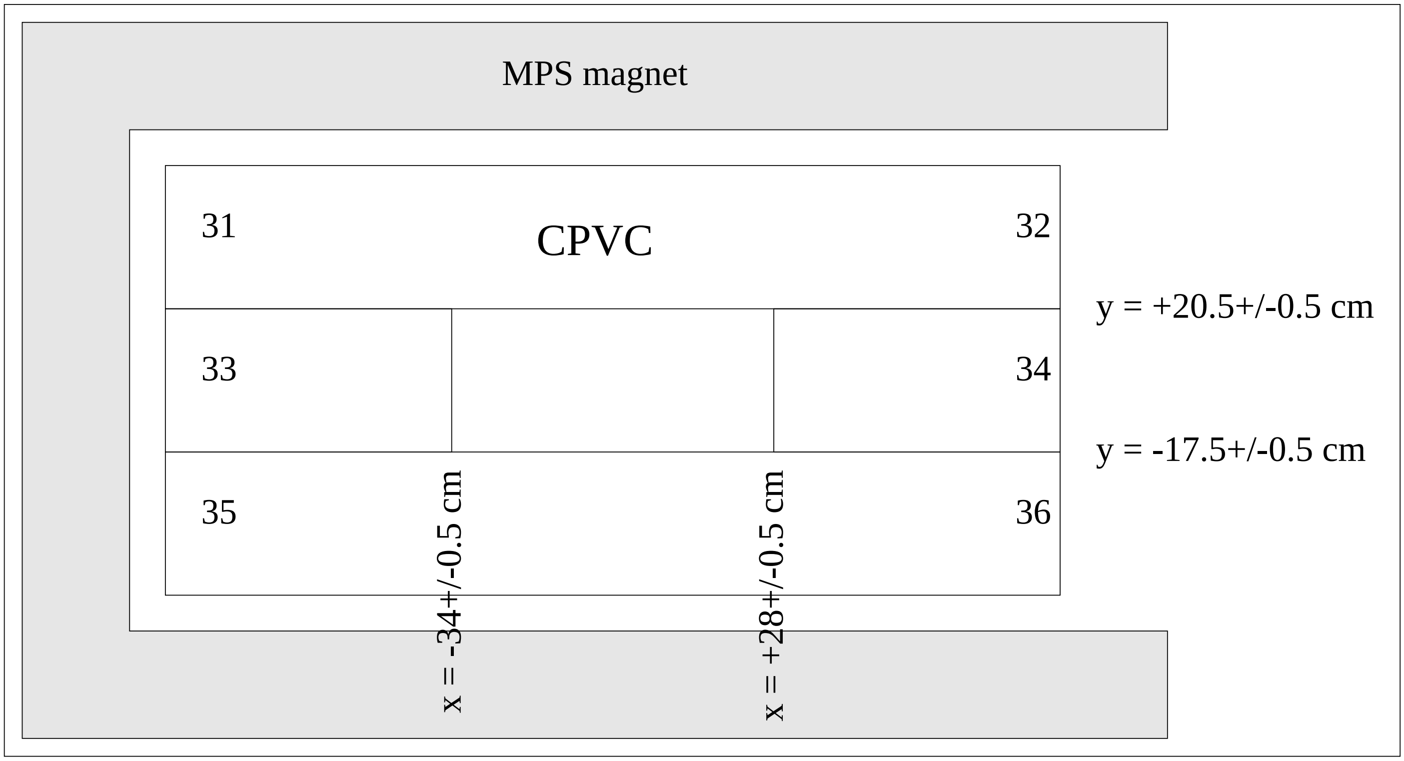

Figure 1: "CPVC geometry, run 10217"

1.2 Measurement of counter response to charged particles

The response of the DEA and CPVC counters to charged tracks was obtained by inverting the procedure used to measure the counter location.

First, the events where the charged tracks hit counter segments were selected by looking at the track positions in X and Y on the counter Z-plane and requiring that both X and Y are within the counter segment boundaries. Then, the ADC spectra for for the selected events were plotted.

The ADC spectra show the pedestal at around 500, the overflows at around 4000 and the minimum ionazing peak between them.

For both DEA and CPVC, the middle segments (3 and 4) appear to work better than other segments both in term of pulse height and separation from the pedestal. The experts explain this by better light collection compared with the top and bottom segments.

2 Channel assignments and location of CPVC

The CPVC channel assignments and segment locations in the MPS coordinates are shown on Fig.1.

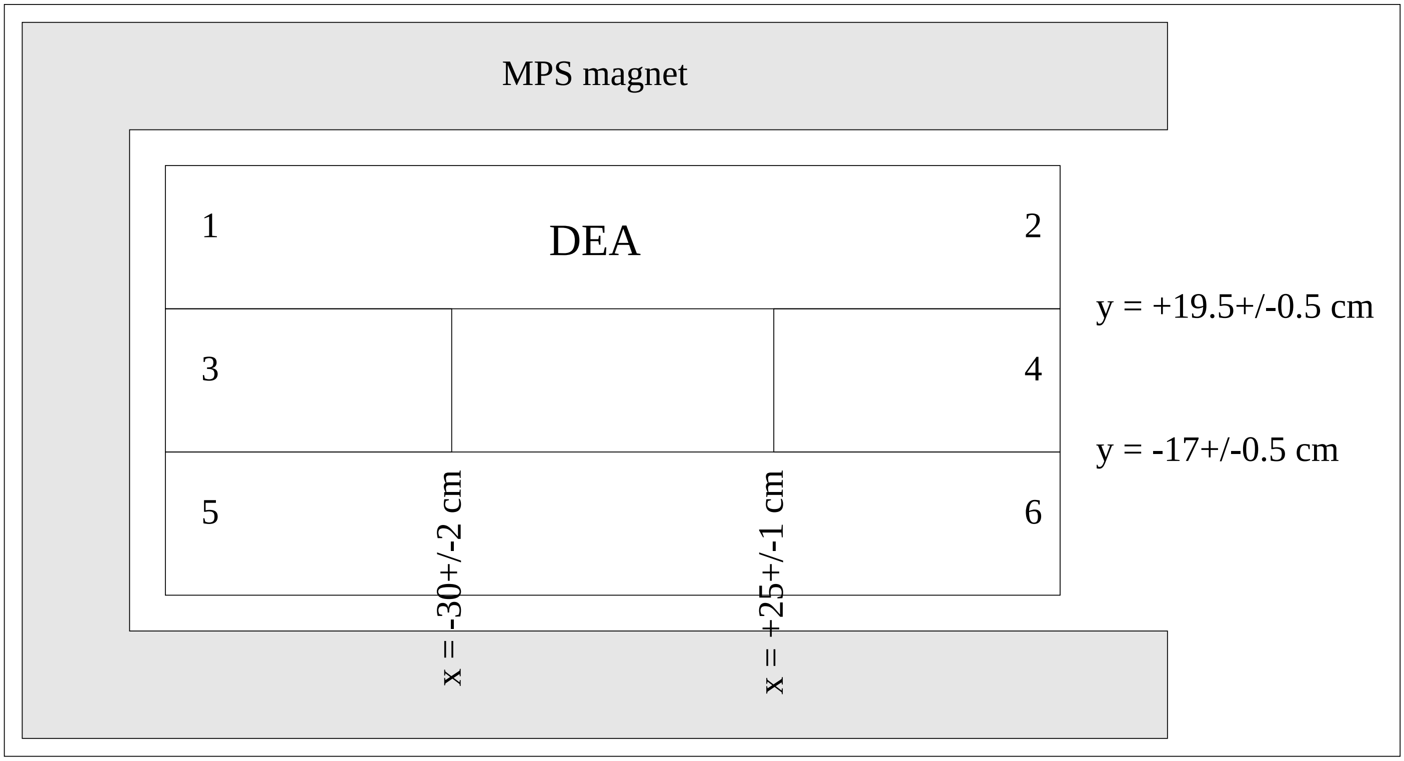

Figure 2: "DEA geometry, run 10217"

3 Channel assignments and location of DEA

The DEA channel assignments and segment locations in the MPS coordinates are shown on Fig.2.

4 Reponse of CPVC to charged patricles

The ADC spectra for all CPVC segments are shown on Fig.3.

5 Reponse of DEA to charged patricles

The ADC spectra for all DEA segments are shown on Fig.4 and 5.

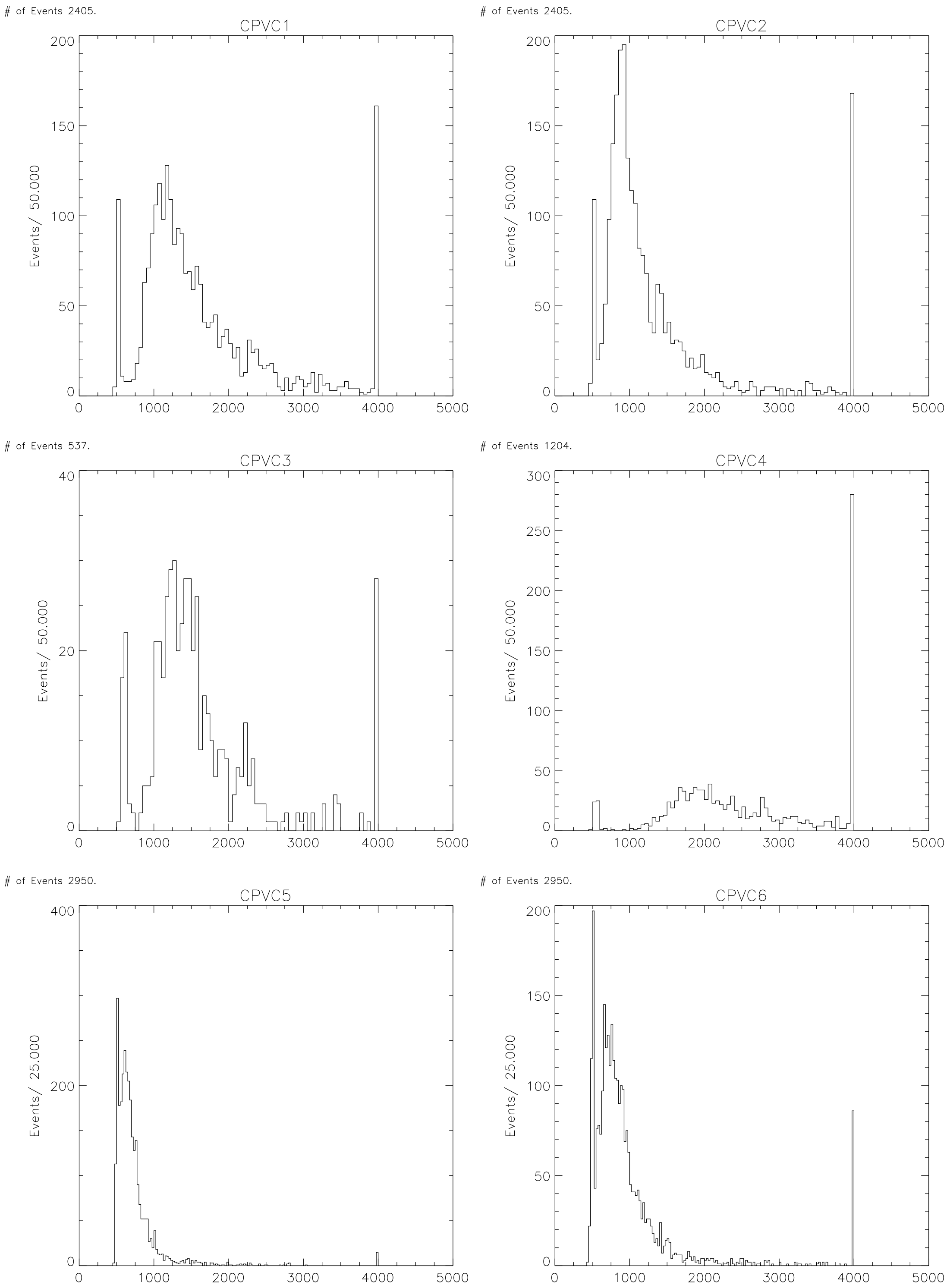

Figure 3: "CPVC ADC spectra, run 10217"

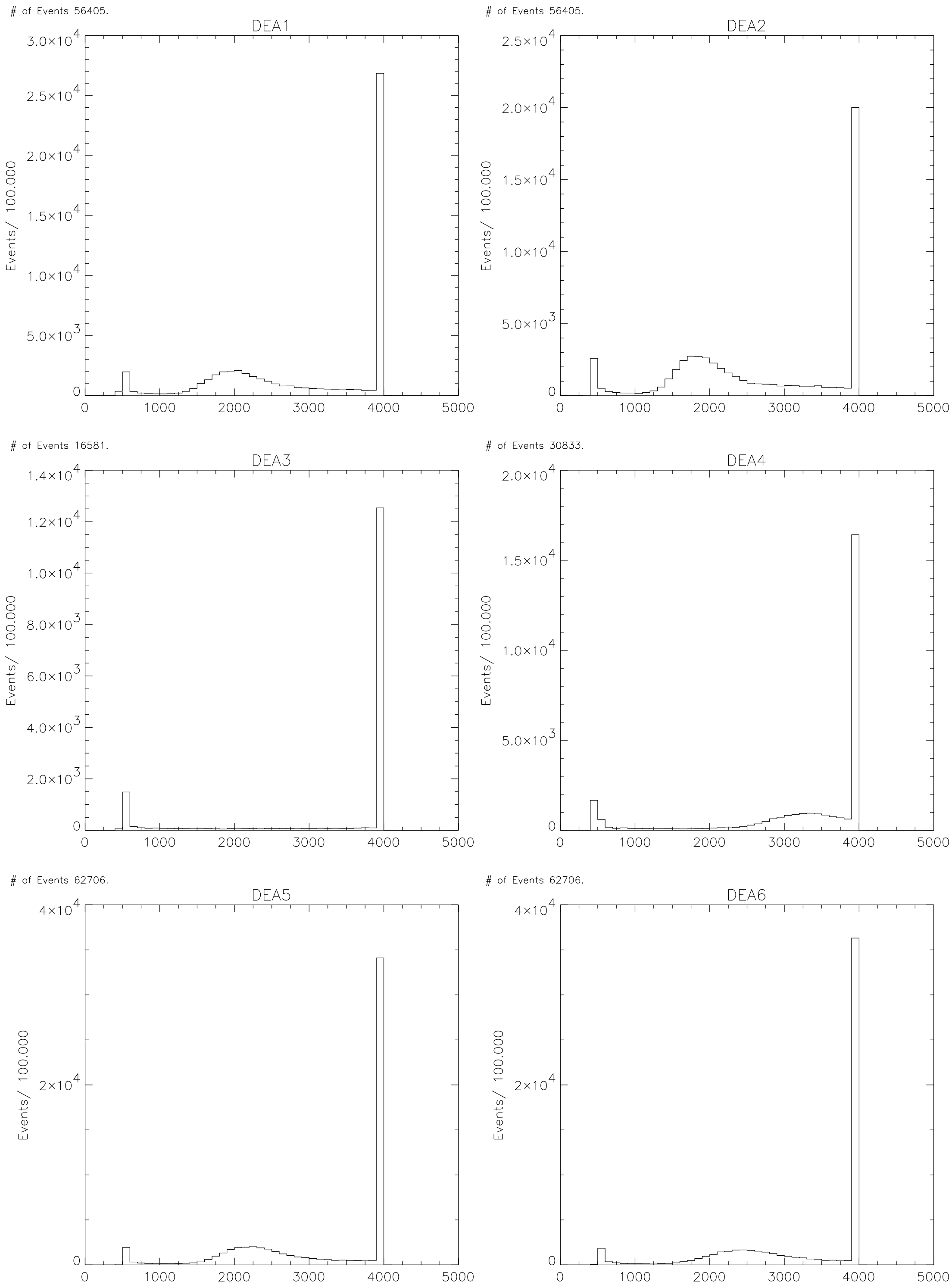

Figure 4: "DEA ADC spectra, run 10217"

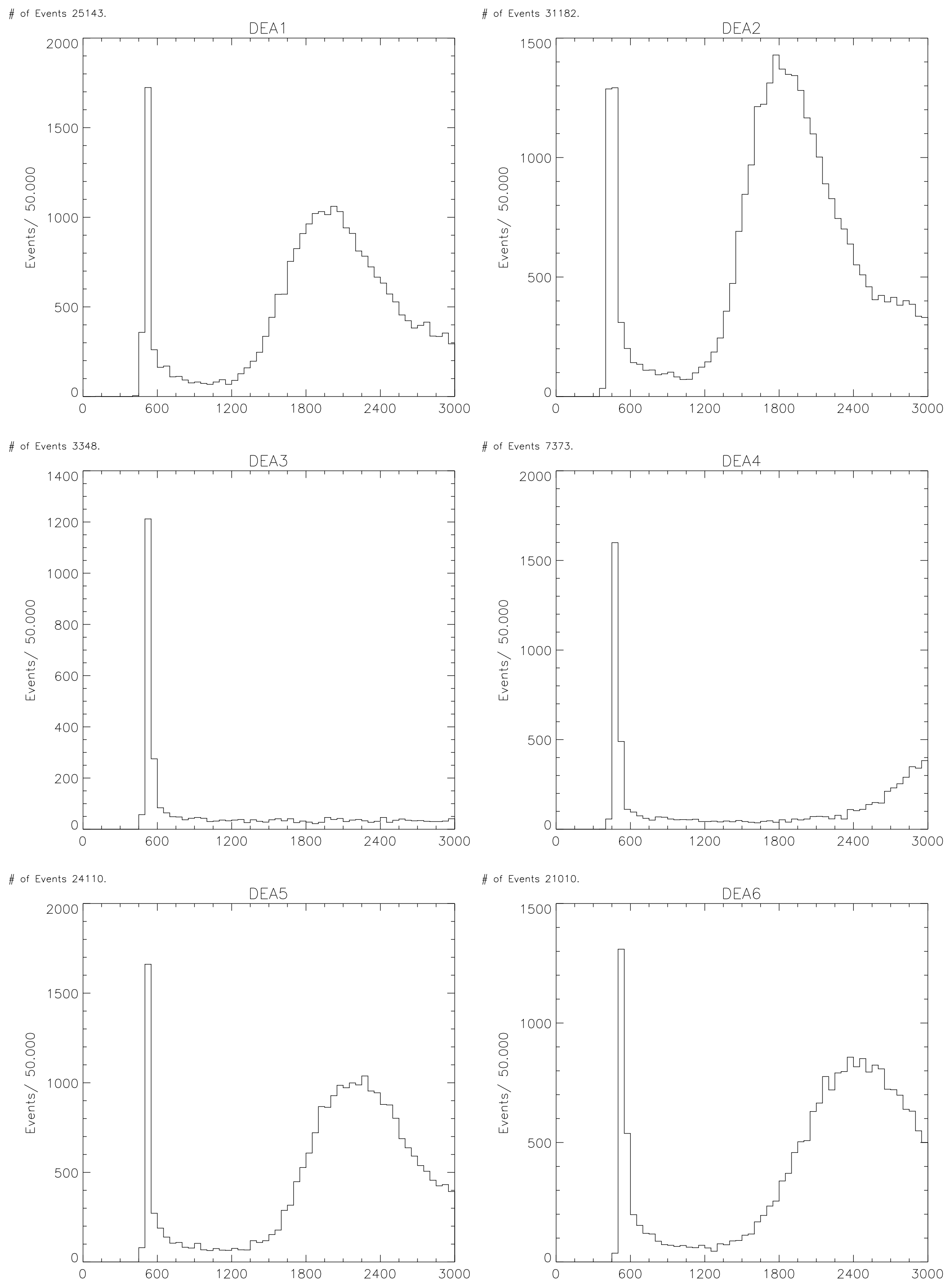

Figure 5: "DEA ADC spectra, expanded scale, run 10217"