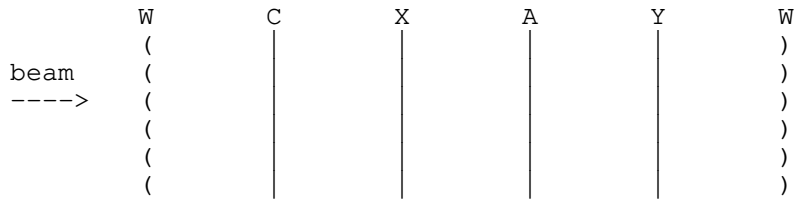
PPAC Primer

Description

It is impossible to completely describe all the intricacies of the detector at the focal plane of the FMA, but this document should answer some basic questions. To know more you should talk to Dale Henderson (creator and maintainer of the PPAC) or Cary Davids.
The standard focal plane detector at the back of the FMA is a multiwired proportional counter (colloquially called the PPAC). It provides X, Y, and E information for the particles which pass through it. Position information is derived from delay line readout off the ends of the X wire plane (R,L) and the Y plane (U,D). The anode starts a TDC and the 4 delay line signals (R,L,U,D) provide stops. X is obtained from R-L and Y is from U-D. Energy loss of ions passing through the PPAC is derived from the cathode signal.

Specifications



- where W=window, C=cathode, X=horizontal position, A=anode, Y=vertical.
- V(cath) = - 200 Volts (typical; slightly higher for alpha source)
- V(anode) = + 350-400 Volts (typical; up to 460 V for alpha source)
- window thickness = 0.8 micron (~119 ug/cm**2) mylar (C10 H8 O4)
- P = 3 torr (isobutane)
- F = 100 sccm
- distance between planes = 3.2 mm
- height = 5 cm
- width = 15 cm
- horizontal delay line = 120 ns
- vertical delay line = 40 ns
- TDC dispersion = 0.1 ns/ch
- X resolution = 1.2 mm

Since the horizontal delay line is 120ns long, the maximum length of the X spectrum is 120ns. This is a good diagnostic tool to check if the detector and the electronics are working properly. 120 ns at 0.1ns/ch (standard setup for PPAC TDC) means a maximum range of 1200 ch, but we compress X by a factor of 4 and display it on 512 ch. So the maximum range of the X spectrum should be 300 ch. You see this with a source, but a narrower range with in-beam data as a result of the acceptance limitations of the FMA.

Calibration

It is important to know where the center of the focal plane is so you know what mass is where. For the details of this consult C.D. You can use the following formula to determine if peaks are neighboring masses or charge states (on the standard 512 channel X spectrum):

- # of channels between charge states = 1938*dQ/Q
- # of channels between masses = 1938*dA/A

NOTE: **A/Q increases to the right. Q increases to the left.**

Electronics

PPAC and trigger part of the electronics

Last Updated: May 24, 1996 (D.J. Blumenthal