NIMROD

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The NIMROD detector array as described in last years report[1] has made significant progress in the past year. All components have now been tested for proof of concept and are now in production. A large fraction of the ordered parts have been delivered and machine shop work is progressing.

The silicon detectors were delivered in May, 1998 and each detector was tested with a ^{228}Th source to insure that the detector properties would meet the specifications of the detector. Shortly thereafter to test the Si detectors in beam and to help make the decision of which preamps to build, we performed an experiment to test the performance of a representative sample of the detectors. Delta-E vs E plots shown in figure 1 for one of the detectors show very good isotope resolution up to Z=10-12. The preamp design for the silicon detectors we settled on was of the Italian type [2]. All preamps have now been constructed in our electronics shop.

The gas ionization chambers have evolved significantly in the past year. The geometry of the IC's is very similar to the INDRA geometry. We have chosen to collect the charge using a series of wires placed in the center of the detector spaced some distance apart. After testing several wire configurations, we have settled on a wire spacing of 8mm. Several in-beam tests were performed. Figure 2 shows a Delta-E vs E plot that we achieved using the above mentioned wire configuration with 50torr of isobutane. We have clear separation in charge up to about Z=16 with the statistics in this plot.

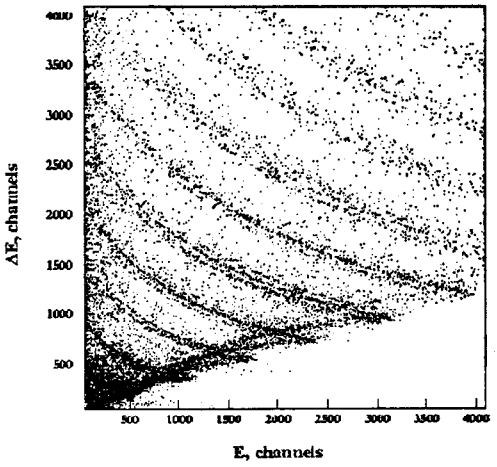

Figure 1 E vs ΔE plot of Silicon detectors

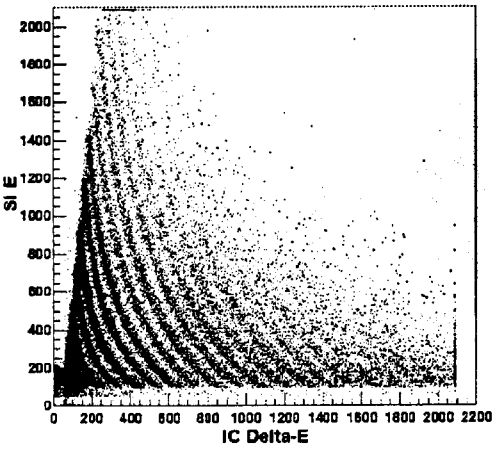

Figure 2 IC ΔE_{IC} vs E_{Si}

The CsI crystals will be read out with Hamamatsu R1924 and R1355 phototubes. In order to conserve space on the inside as well as avoid the common problems associated with operating phototube bases in vacuum, we have designed a scheme to operate the bases outside the vacuum. Cards each containing 2 bases are mounted on a 34 pin connector on the outside of the vacuum chamber. Ribbon cables connect the bases to the phototubes. Several tests have been performed with the CsI crystals in beam to both verify the quality of the CsI crystals as well as to test this scheme of placing the bases outside the vacuum chamber when the phototubes are inside. Figure 3 shows a representative fast vs. slow plot obtained with one of the crystals connected in this way.

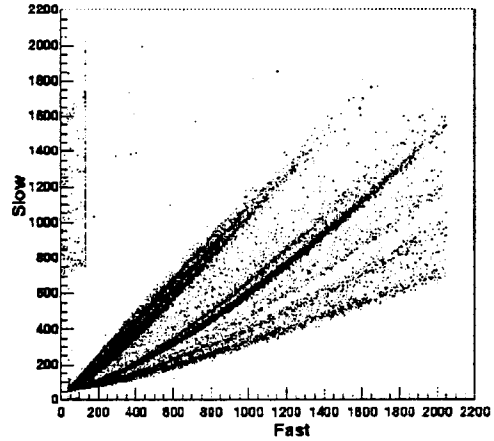

Figure 3, Fast vs Slow plot for CsI detector

References

1. N. Marie *et. al., Progress in Research,* 1997-1998, p V-19.
2. G. Prete, private communication.