

GlueX Beam Tests

GlueX-doc-5xx

The GlueX Collaboration
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Abstract

A brief abstract of the note that will be placed on the search sites to allow searching the document

During the collaboration meeting discussion, several different beam tests over the next three years were identified as useful for various GlueX detectors. These included tests in the alcove of Hall B at Jefferson lab, tests in the M11 beam line at TRIUMF and possible tests at TUNL and Duke University. The purpose of these tests are all directed at making final decisions on technology, what the device should yield, or understanding the resolution of a detector.

1 The Barrel Calorimeter, BCAL

The first 4-m module of the BCAL is currently ready for testing in a photon beam. By the end of summer, it is likely that the 2nd module which will be built with a mix of green and blue fibers will be ready for testing. The goals of these tests will be to scan the detector with photon beams at incident angles that mimic those in the real detector. It would also be very useful to carry out timing studies of photons coming in at shallow angles near the end of the BCAL. In order to do the latter, it will be necessary to have some granularity in the readout.

This first test will be carried out sometime after mid-2006 using low flux beams of tagged photons in the Hall B alcove using photons. This would likely need to occur during G0 running when CLAS is not running.

The tests will concentrate on measurements of energy and time resolution and linearity as a function of incident angle - at several positions along the module. Zisis will be the overall coordinator for this test. Eric (IU) will design a remote controlled transport system and will also work with the UR group on producing light guides. We still need to decide whether to use FEU-84-3 or XP2020 PM's

2 The Forward Calorimeter, FCAL

A 64-channel FCAL test module will be ready for beam testing in 2007. Up until that time, work will be on going at IU to find the best way to couple the phototubes to the lead glass blocks. The goals of a run in the Hall B alcove would examine the following. Position and angle scans would mimic the real environment of the detector. Linearity studies would be made to determine the response of the detector to high energy photons. If available, testing the energy sums on the 250MHz FADCs. Such a test would also need information from the CLAS tagger and would probably need to be done when CLAS was not running.

A second beam test using low energy electrons would also need to be carried out at TRIUMF. This test would measure the response of the system to photons/electrons in the 50MeV to 150MeV range. This TRIUMF test would be made in conjunction with the TOF wall to allow studies of the two detectors operating together.

3 The Straw Tube Chamber, CDC

The most useful beam tests for the CDC would take place at TRIUMF. Response of the detector to π , μ and e 's would be studied which would allow both resolution measurements as well as dE/dx information to be examined. Such tests would likely need to take place in either late 2007 or in 2008.

4 The Forward Drift Chambers, FDC

The small prototype is essentially ready for beam tests now if there is some reason to do so. The full scale prototype is not planned to be ready until late 2008 or early 2009.

A beam test with the small prototype at TRIUMF to look at dE/dx was brought up as an interesting beam test that could be carried out in conjunction with either the FCAL tests in 2007 or the CDC tests in 2008.

5 The Active Collimator

There will be a prototype of the active collimator ready for testing in Hall B in the fall of 2006. Such a test would want relatively high photon flux. The detector is self standing and is used to determine the centroid of the photon beam. This could likely be coupled with a running experiment in Hall B, such as g9 which is run with polarized beam and target in fall of 2006

6 Issues for the Electronics

1. Support detector tests as needed
2. Look at tagger data instrumented with F1 TDCs
3. Clock distribution to electronics

If the CLAS tagger is to be partially instrumented with F1TDC,s someone needs to budget the cost of more F1 TDC boards. Such tests would need to be carried out in Hall B and could hopefully run parasitic with Hall B experiments. The g9 experiment may also be a good match here.