Proposal # C12-12-002 for PAC40

Title: An initial study of hadron decays to strange final states with GlueX in Hall D

Contact person: Curtis Meyer (CMU)

Beam time:

Beam days requested: 200 Detector commissioning time included in request: 0

Base Equipment

Hall:

D

Beam parameters:

Energy: 12 GeV yes Current: 2.2 μ A yes Polarization: 0 % yes Emittance: 10 mm μ r yes

Targets:

Nuclei: ¹H yes

Spectrometers:

Hall D standard yes

Special requirements: none

New equipment required:

L3 computer farm:

Comments:

The second stage of the experiment GlueX is proposed. The first stage of 120 days was approved by PAC36. The main purpose is to increase the sensitivity of the experiment, including some states which contain charged kaons in their decay products and which can be identified by kinematic fitting. The experiment requires a L3 computer farm in order to be able to run at a beam intensity of 50 MHz in the coherent peak. The GlueX apparatus was designed for a beam rate of 100 MHz.

.L3 farm

The tape recording will be limited to 300MB/s, which corresponds to an event rate of about 20kHz. The L1 trigger will provide this rate at the photon beam intensity of 10MHz in the coherent peak (8.4-9.0 GeV). The DAQ will be able to provide a readout from the VME at 3GB/s, or 200kHz. In order to increase the beam intensity (by a factor of 5 in the proposal) an L3 farm will be applied. It must be able to filter out the electromagnetic and

low energy background and reduce the event rate from 200 kHz to 20kHz. The L3 farm was a part of the original Hall D project. It is expected that 2500 cores will be sufficient. The filtering algorithms must be elaborated, in order to optimize the size of the farm. Additionally, the networking capabilities of the elements between the VME crates and the farm must be verified. The L3 farm construction is included in the Physics Division Capital Equipment Plan.

Providing manpower for manning shifts, taking care of the equipment and online-processing the data may become a challenge.

Long running will require spares for various parts of equipment.

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In summary, the proposal does not go beyond the original GlueX project in the beam or detector requirements. It requires building an L3 farm – a part of the original design. Implementation of the L3 farm is relatively straightforward, although requires an optimization of the size.