1 June 2005 Minutes from Conference Call Re: Electronics for GlueX Drift Chambers

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Participants:

Paul Smith, Alex Dzierba, Gerard Visser, Lars Holm, Dan Carman, Simon Taylor, Curtis Meyer,

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FDC: Gerard Visser has been looking at signals from the prototype; questions remain regarding the gain of the overall system and the amount of charge being produced by the chamber. CLAS preamps are being used.

Still to be done: calculations, simulation, measurements from prototype. Beam test? More layers will be required to test dE/dX in a beam. A full size prototype will need to be constructed. Can the JLab detector group get involved?

Biggest question: can we get a dE/dX measurement from the cathodes alone, or will the anodes need ADCs (instead of TDCs)? A signal-to-noise ration of at least 100:1 will be required for the cathode position interpolation; if this is achieved, it should be adequate for dE/dX.

Known parameters: 1) gas gain is 4 or 5 x 10^4 2) Anodes need ~2 ns timing resolution

CDC: Prototype full length chamber segment is complete. Gas system is being commissioned. CLAS preamps will be used.

Still to be done: calculations, simulation, measurements from prototype. Beam test?

It may be desirable to build a small, portable prototype for beam tests. Tests of dE/dX need to be done with beam.

Simulations: It will be important to simulate the statistics of gas ionization and charge distribution. Large variations in pulse shape are expected as a function of track trajectories through the chambers. The pulse shaping characteristics of the preamps are the most important question to answer. Additional shaping at the ADC may be required. On board processing algorithms need to be developed and tested. It is expected that this will be an iterative process.

Although feedback from the hardware designers will be necessary, simulations could proceed independently of chamber testing. It would be desirable for one person to simulate both the CDC and FDC chambers. Alex will discuss this with FIU. A lot of similar work has been done for the ATLAS detector, so there is a good starting point.