

HALL D / GLOEX REPORT

**GLOEX: THE SEARCH FOR GLUONIC
EXCITATIONS AT JEFFERSON LABORATORY**



**DANIEL S. GARMAN
OHIO UNIVERSITY**

Collaboration

U.S. Experimental Groups

Carnegie Mellon University

Catholic University of America

Christopher Newport University

University of Connecticut

Florida International University

Florida State University

Indiana University

Jefferson Laboratory

Los Alamos

Norfolk State University

Old Dominion University

Ohio University

University of Pittsburgh

University of Tennessee/Oak Ridge

A. Dzierba (Spokesman) – IU
C. Meyer (Deputy Spokesman) – CMU
E. Smith (Hall D Group Leader) – JLab

Collaboration Board

D.S. Carman – OU *A. Szczepaniak – IU*
P. Eugenio – FSU *R. Jones – UConn*
G. Lolos – Regina *J. Kellie – Glasgow*

Other

Experimental Groups

University of Alberta

University of Athens

University of Glasgow

Institute for HEP – Protvino

Moscow State University

Budker Institute – Novosibirsk

University of Regina

Theory Groups

CSSM & University of Adelaide

Carleton University

Carnegie Mellon University

Florida State University

Institute of Nuclear Physics Cracow

Hampton University

Indiana University

Los Alamos

North Carolina Central University

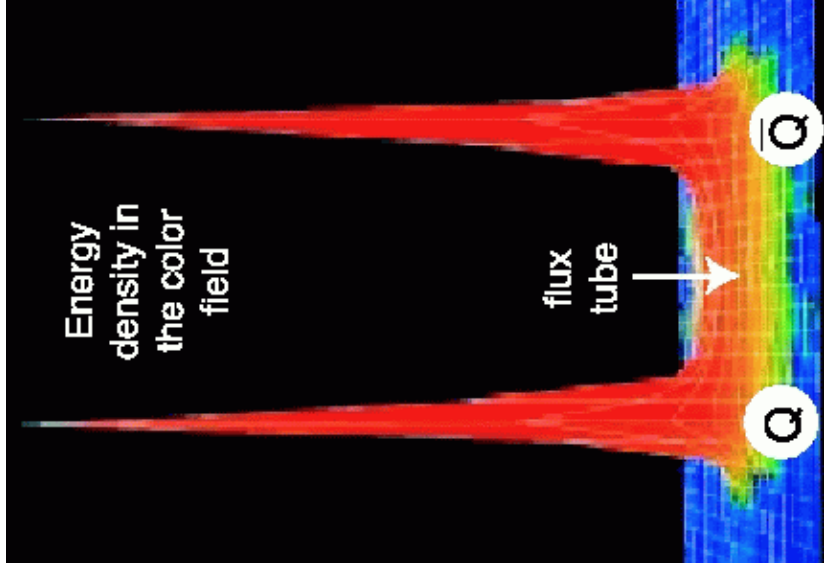
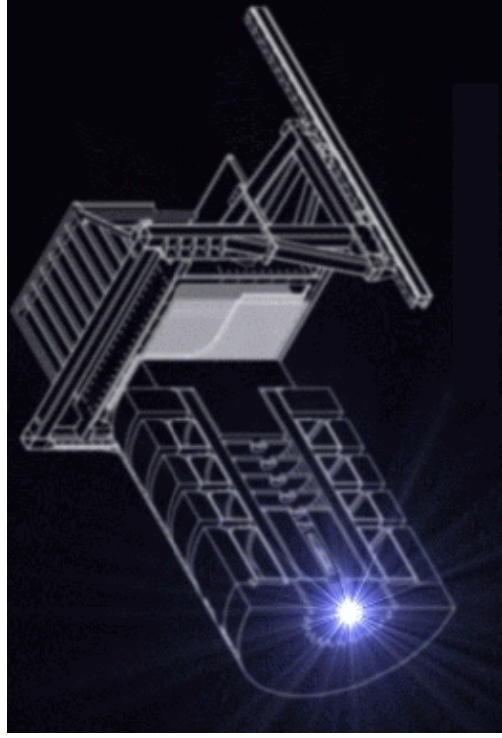
University of Tennessee/Oak Ridge

100+ Collaborators, 25+ Institutions

Motivation

Confinement:

- *One of the great mysteries of modern physics is the mechanism that confines quarks into hadrons.*
- *Confinement arises from flux tubes and their excitation leads to a new meson spectrum.*



- *GlueX represents the flagship experiment of the Jlab energy upgrade.*

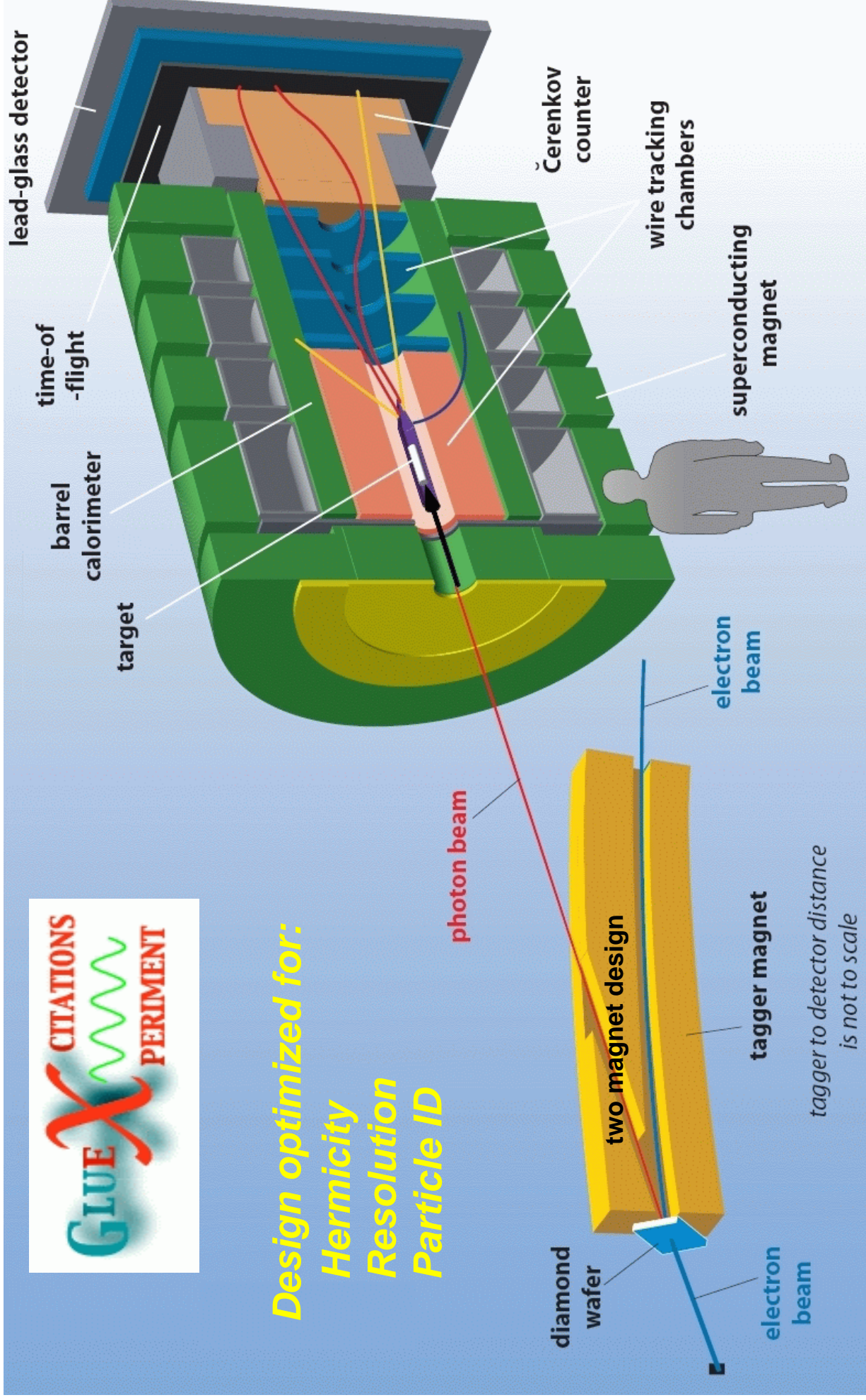


- *New arc, beam line, tagger facility, and experimental Hall.*

GlueX Detector in Hall D



*Design optimized for:
Hermeticity
Resolution
Particle ID*



GlueX will exceed existing photoproduction data in its first year by several orders of magnitude.

GlueX Time Line – Past Year

- **External review: GlueX Detector Review – October 2004**
- **External review: GlueX Solenoid Magnet Review – November 2004**
- **JLab review: Hall Layout Options – December 2004**
- **GlueX Electronics Workshop – December 2004**
- **External review: PAC27 Science Review – January 2005**
- **JLab Grid Computing Workshop – April 2005**
- **GlueX Collaboration Meeting – May 2005**
- **GlueX Electronics Workshop – June 2005**
- **External review: CD-1 "Lehman" Review – July 2005**
- **External review: JLab Science & Technology Review – August 2005**

GlueX Detector Review

Charge :

Review the GlueX detector and the tagger facility.

- *Is the GlueX detector design sound?*
- *Are the development milestones realistic?*
- *Are the technologies appropriate?*
- *Are current R&D plans appropriate?*
- *Review technical feasibility.*

Findings :

- *"The committee was satisfied overall with the detector concepts and the strategy the Collaboration has taken with respect to detector design."*
- *"The committee was also impressed at the amount of R&D the Collaboration has managed to achieve over a period of years in which the prospects have been so uncertain. This speaks to strong physics motivation, coherent leadership, and a vibrant sociology within the Collaboration."*

M. Albrow, J. Alexander, B. Dunwoodie, B. Mecking

GlueX Solenoid Review

Charge:

Review status of LASS/MEGA superconducting solenoid.

- *Provide advice to guide the decision to continue coil refurbishment.*
- *Review test plans for magnet refurbishment.*
- *Review all preliminary activities in advance of magnet installation.*
- *Propose near term activities to reduce costs/risks.*

Findings:

- *Investigate nature of all ground faults and complete all inspection tests before continuing refurbishment plans.*
- *The committee endorses the planned test plans for the magnet.*
- *Design system to ensure coil plumbing is continuously protected from moisture and oxygen to limit corrosion.*

B. Kephart, C. Rode, J. Alcorn

GlueX Activities – Past Year



Superconducting Solenoid

Refurbishment of coils continues.



Lead Glass Detector

Refurbishment of lead glass continues.



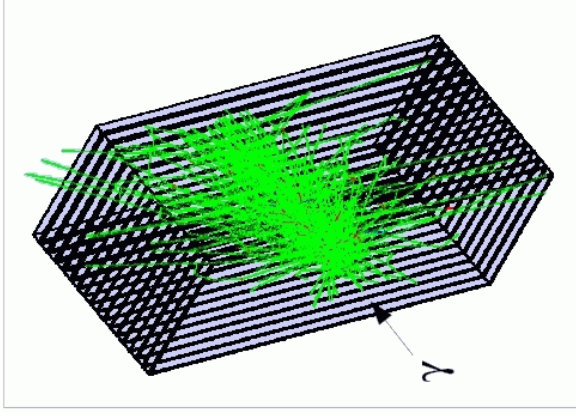
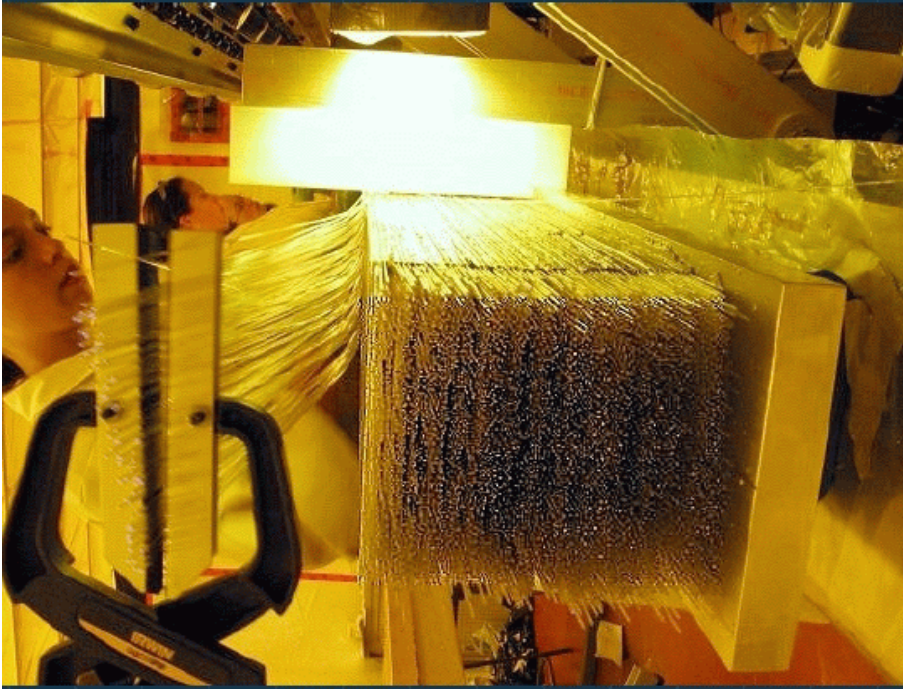
GlueX Activities – Past Year

i). R&D on module fabrication completed.

ii). Completed summer 2005 beam test at TRIUMF with prototype

iii). Working on readout devices.

Barrel Calorimeter

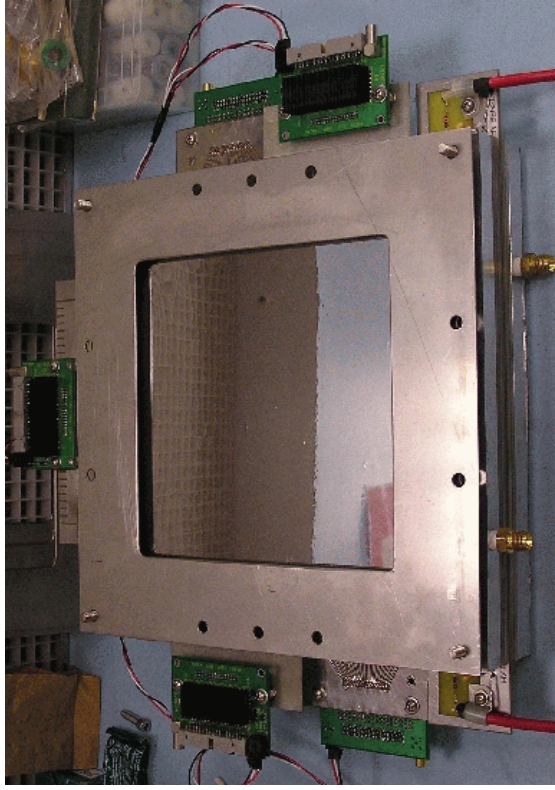


Upstream Photon Calorimeter

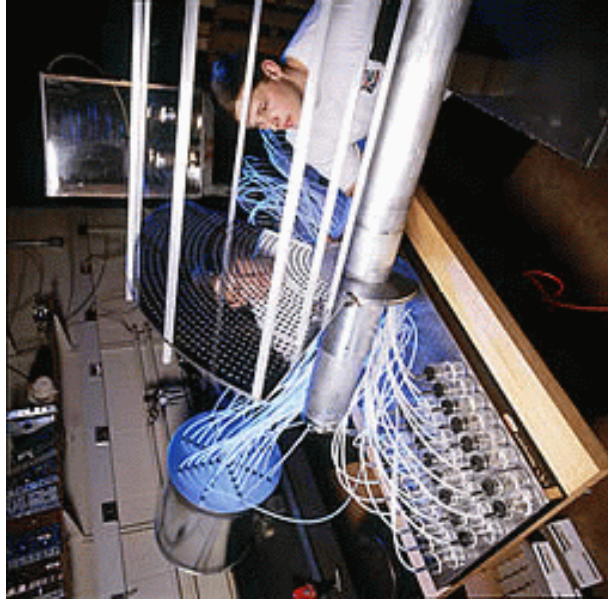
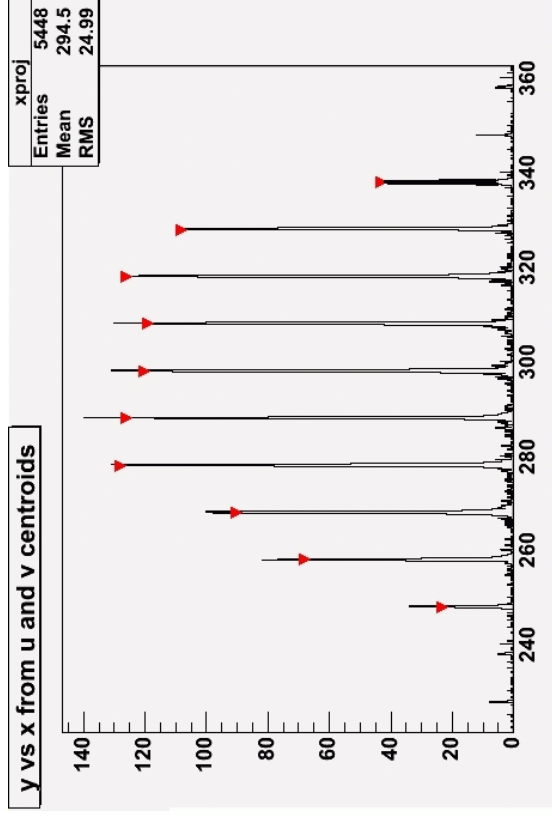
i). Prototyping

ii). Simulations

GlueX Activities – Past Year



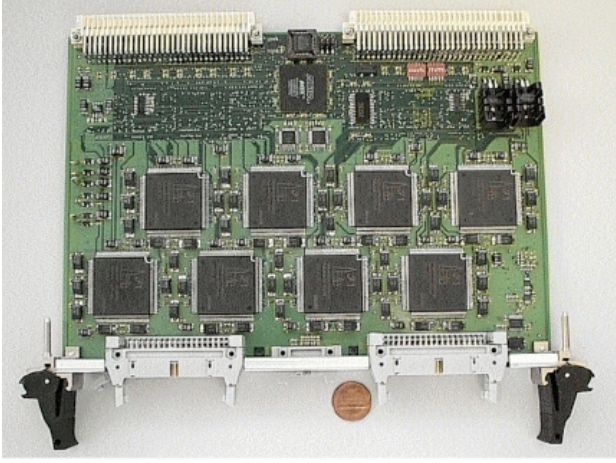
Forward Drift Chambers



Central Drift Chambers

Prototyping efforts continue.

GlueX Activities – Past Year



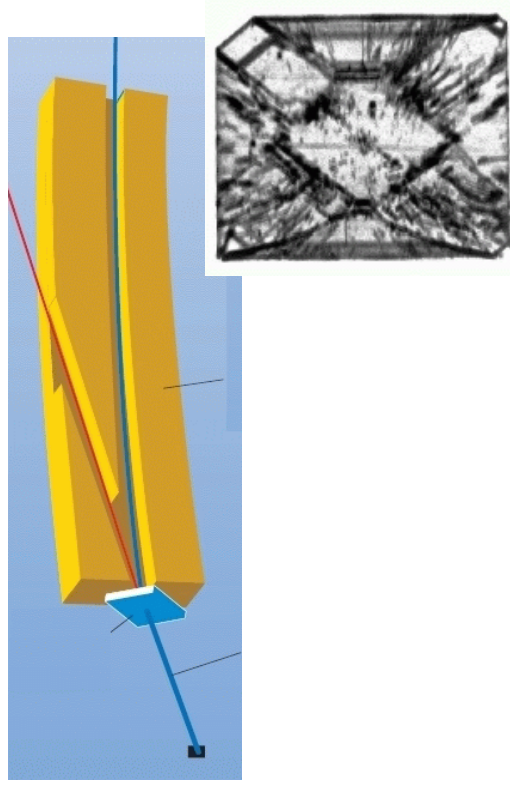
Electronics Design

Development of ADCs, TDCs, amplifiers

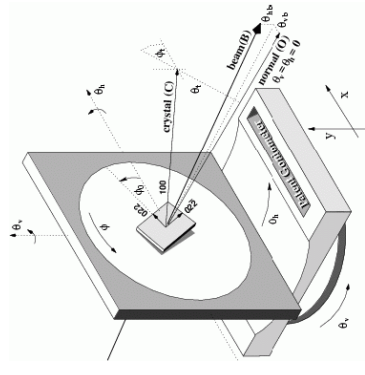
- Work continues on finalizing choice of design for Cherenkov detector.

DIRC vs. high pressure gas

- Tagger magnet, focal plane, goniometer, collimator, microscope, etc.



Design completed



Upcoming Activities

- GlueX Software Workshop – October 2005.
- **External review: Beam line & Tagger – November 2005.**
- GlueX Collaboration Meeting – November 2005.
- Celebration of CD-1 – push towards CD-2a,b.
- **R&D continuation on all detector subsystems.**

LOTS OF ONGOING ACTIVITY!