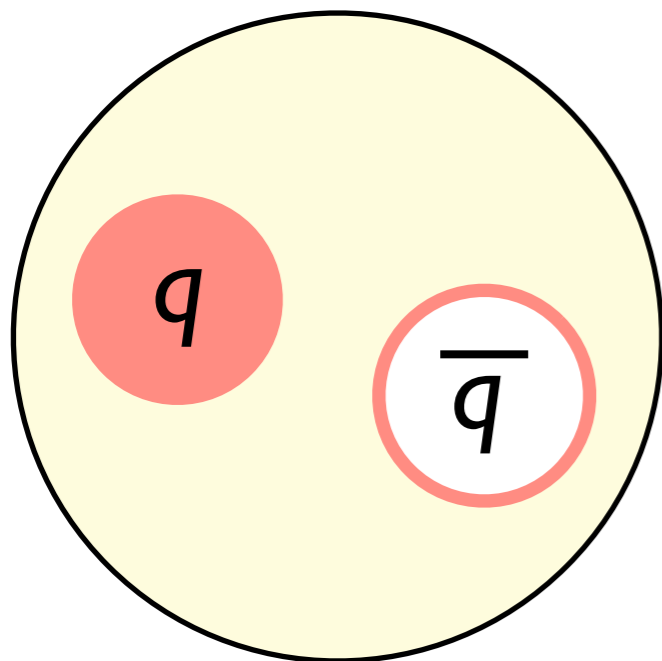


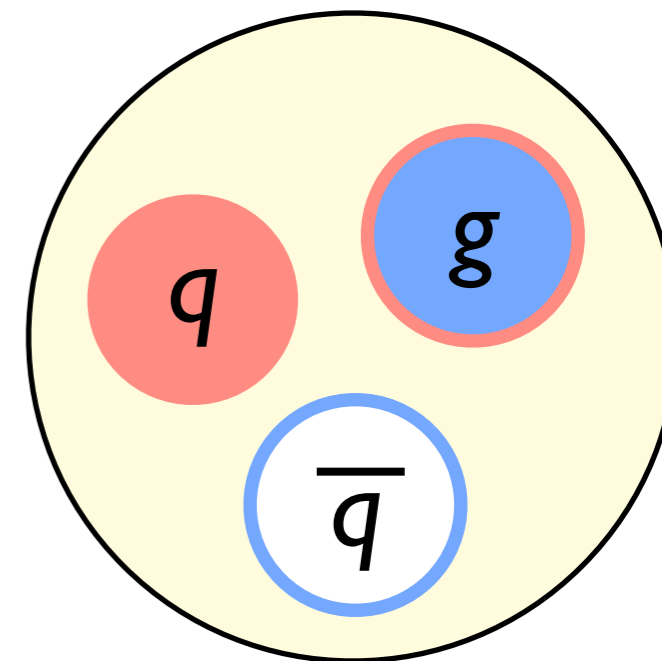
The current status of



at Jefferson Lab



*a search for mesons
with gluonic degrees
of freedom using
the 12 GeV CEBAF*

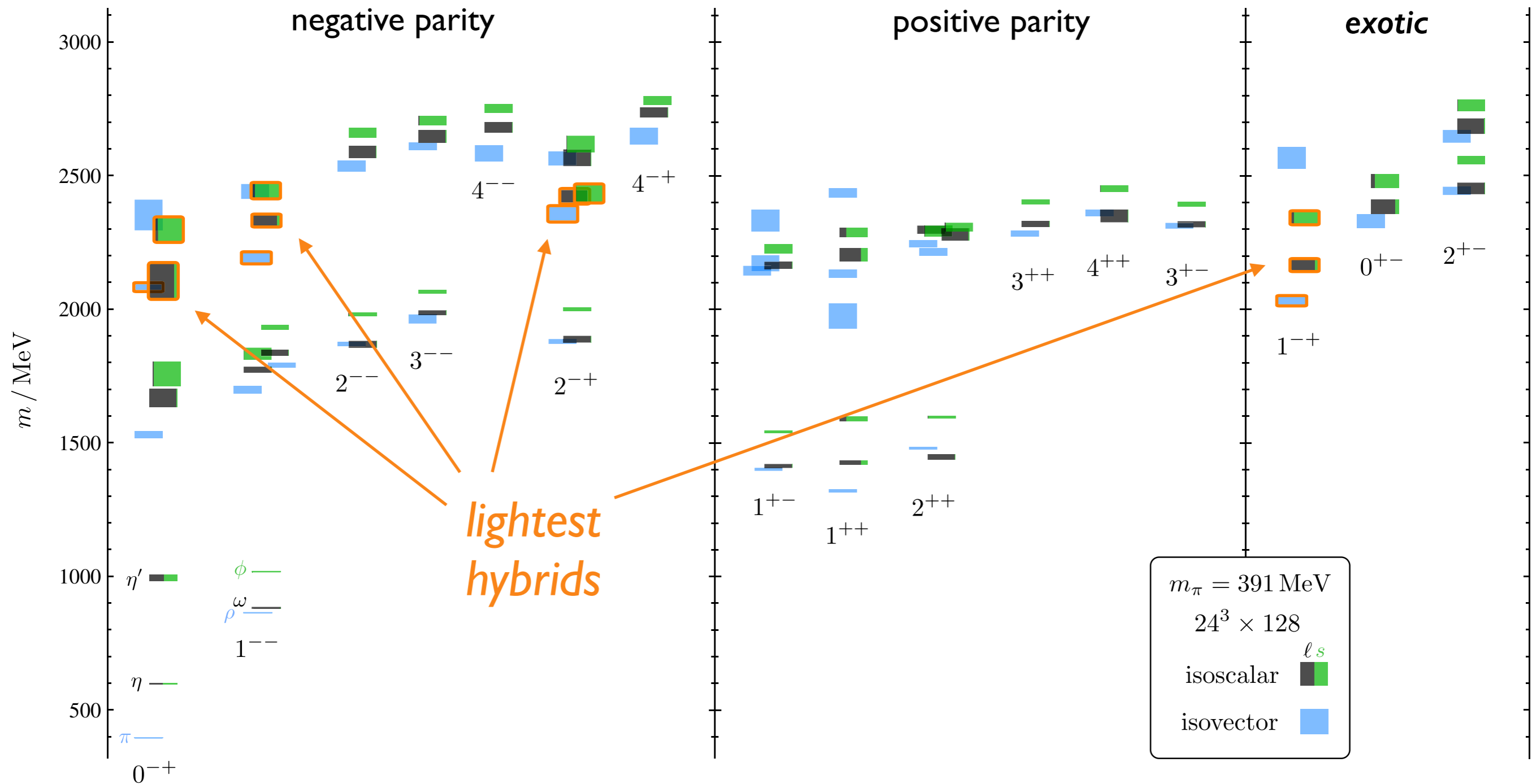


Matthew Shepherd
Indiana University

April APS Meeting, Salt Lake City
April 16, 2016

Light Meson Spectroscopy

Dudek, Edwards, Guo, and Thomas, PRD 88, 094505 (2013)

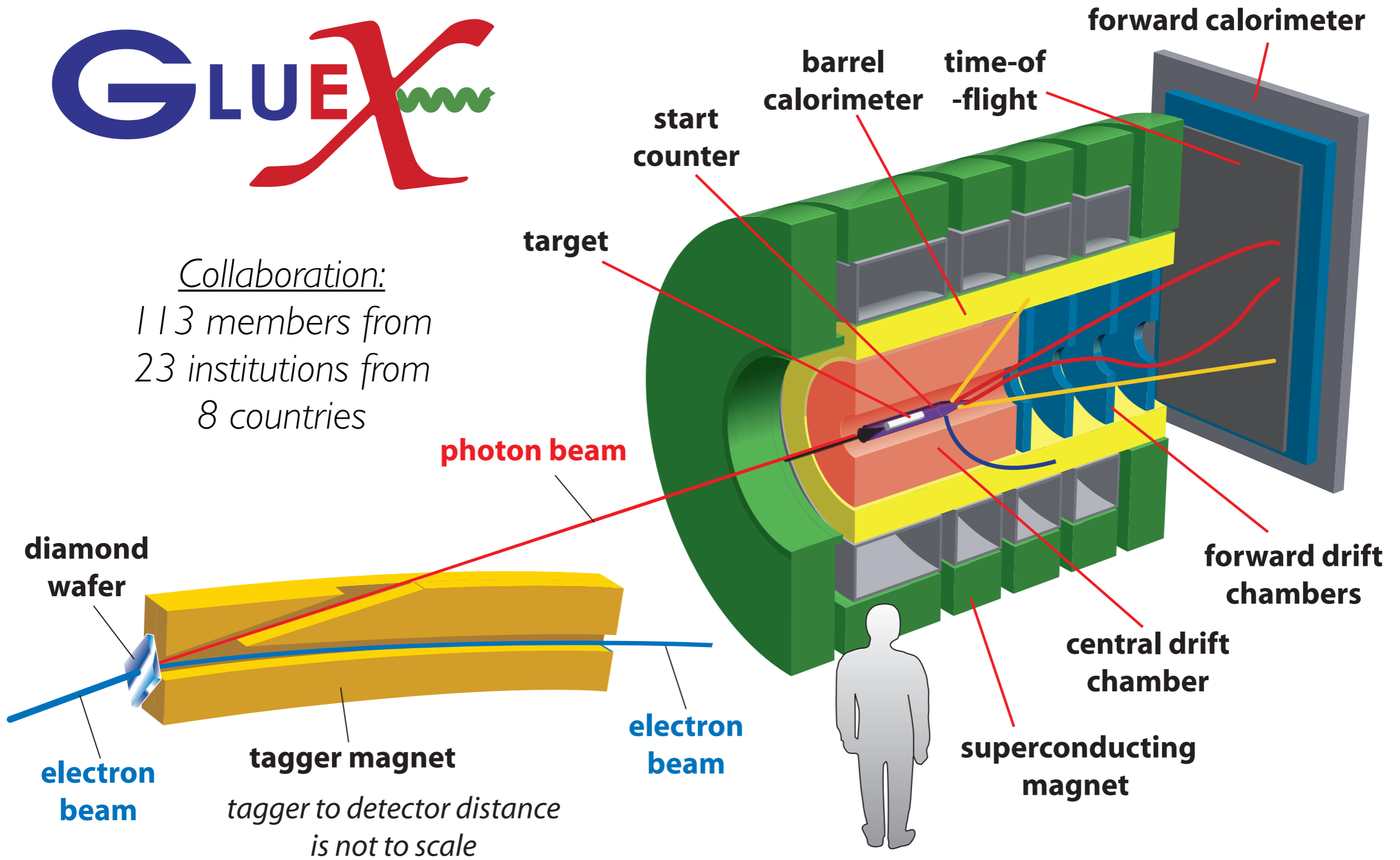


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GLUEX

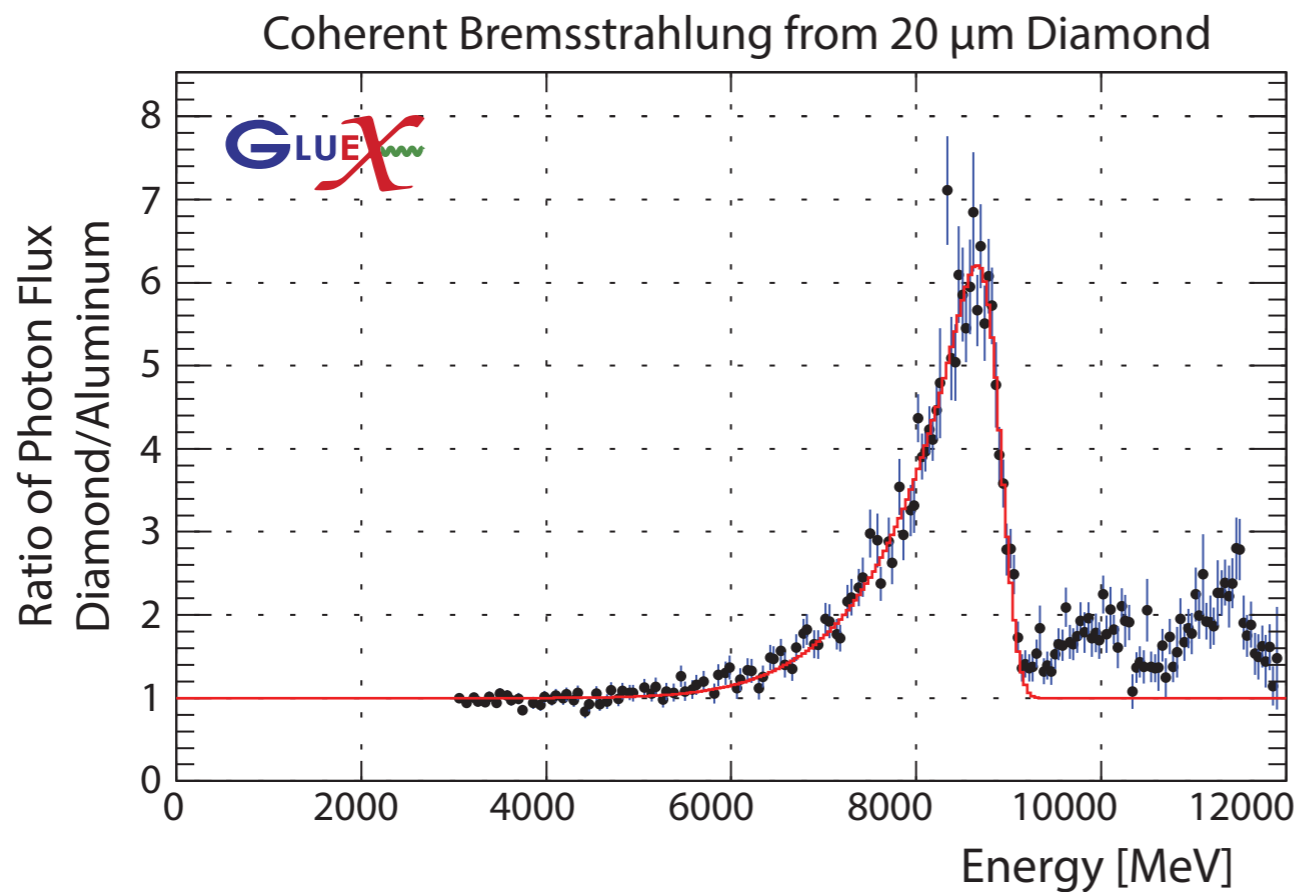
Collaboration:
 113 members from
 23 institutions from
 8 countries



*tagger to detector distance
 is not to scale*



The Hall D Photon Beamline



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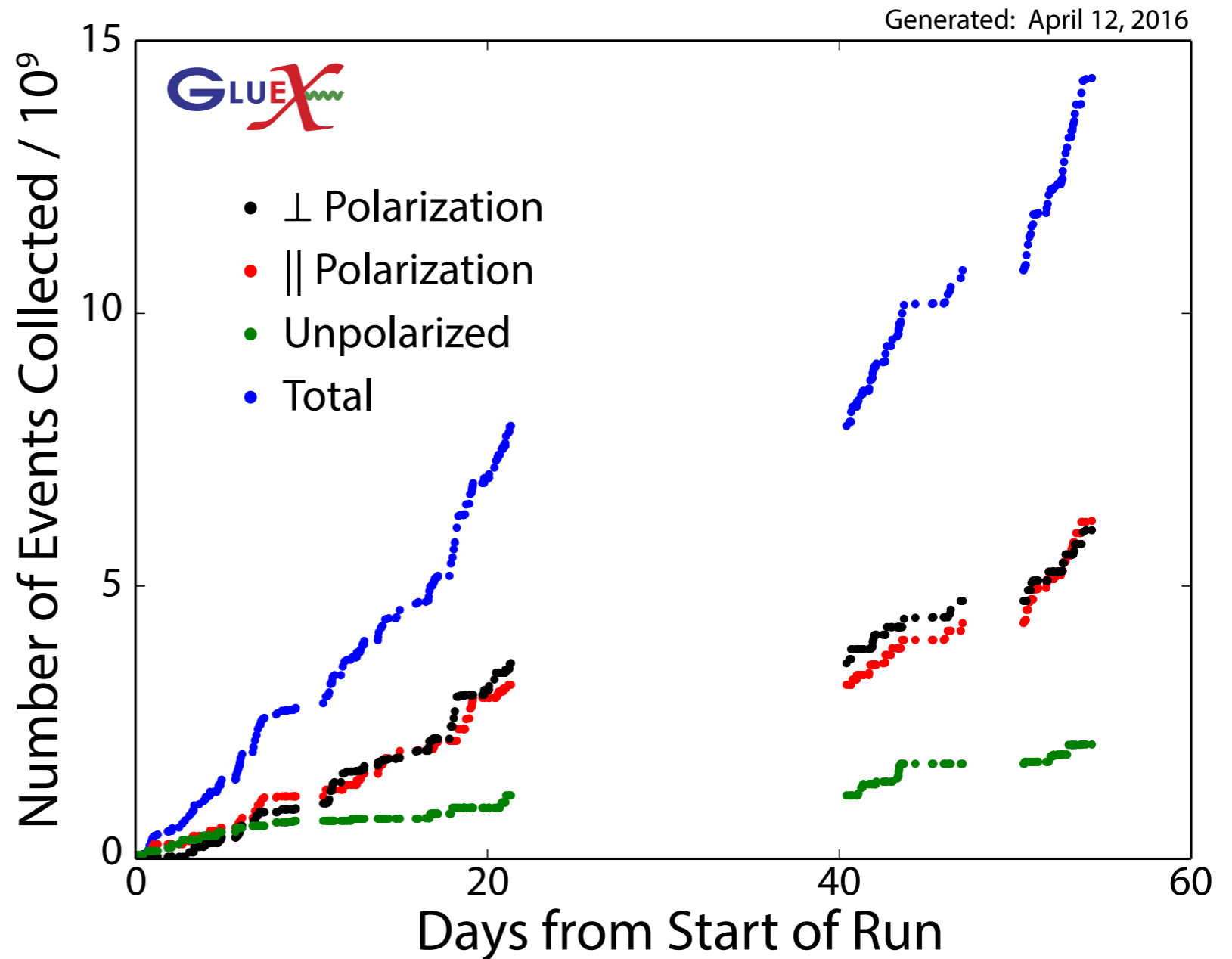
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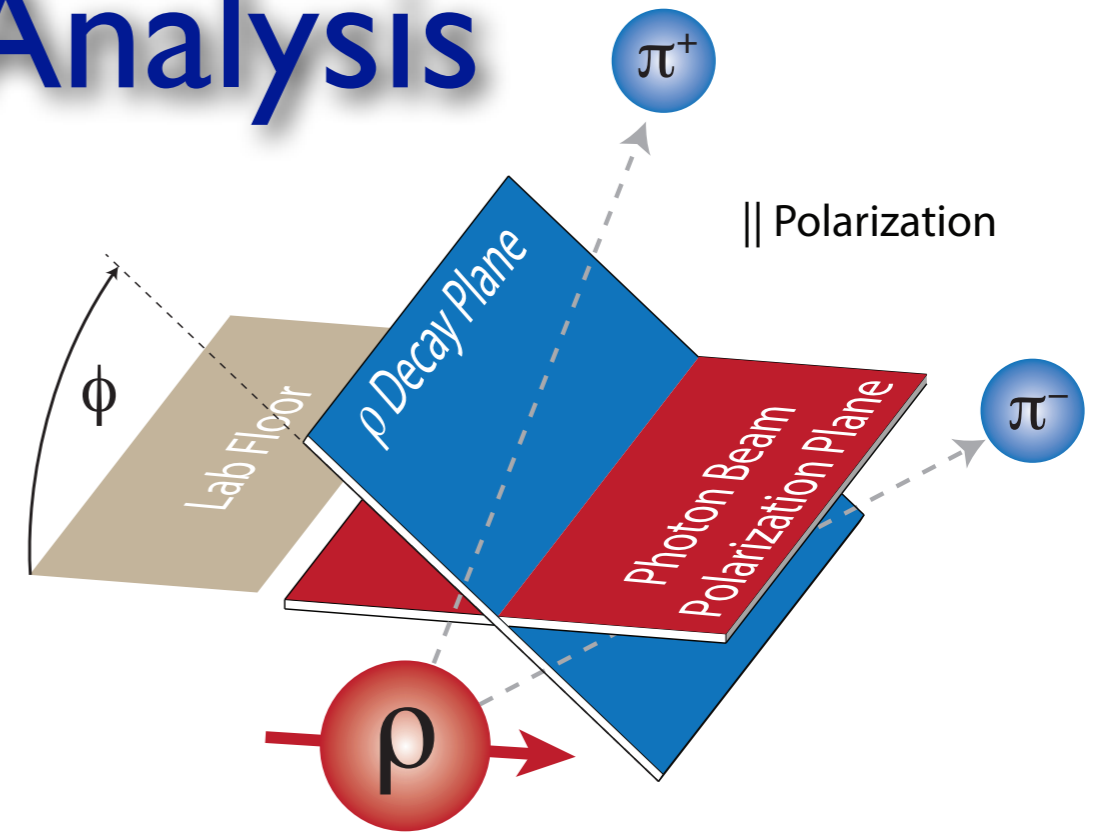
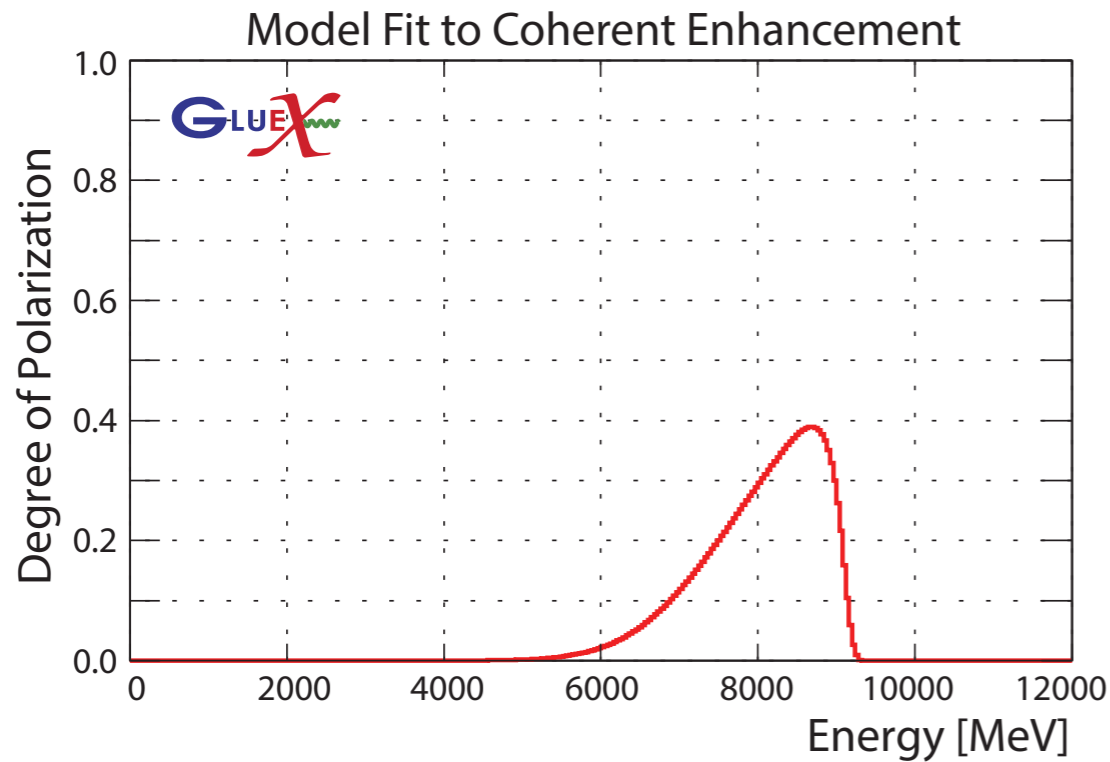
GlueX Detector with
Prof. Curtis Meyer
GlueX Spokesperson
October 2014

Spring 2016 Run Period

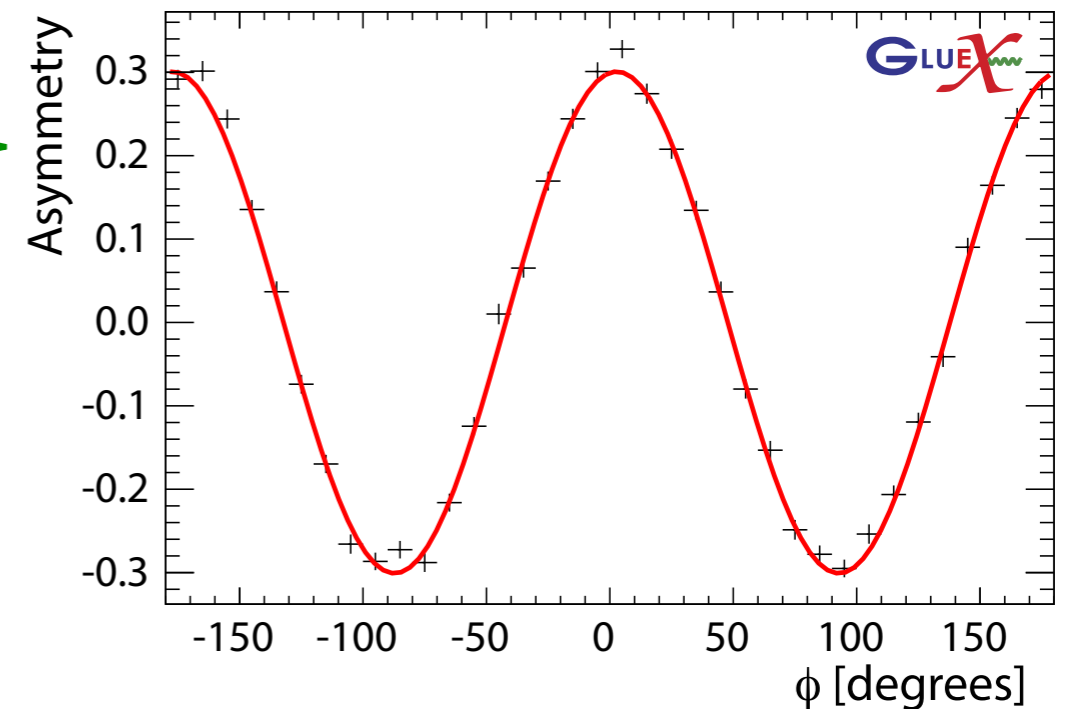
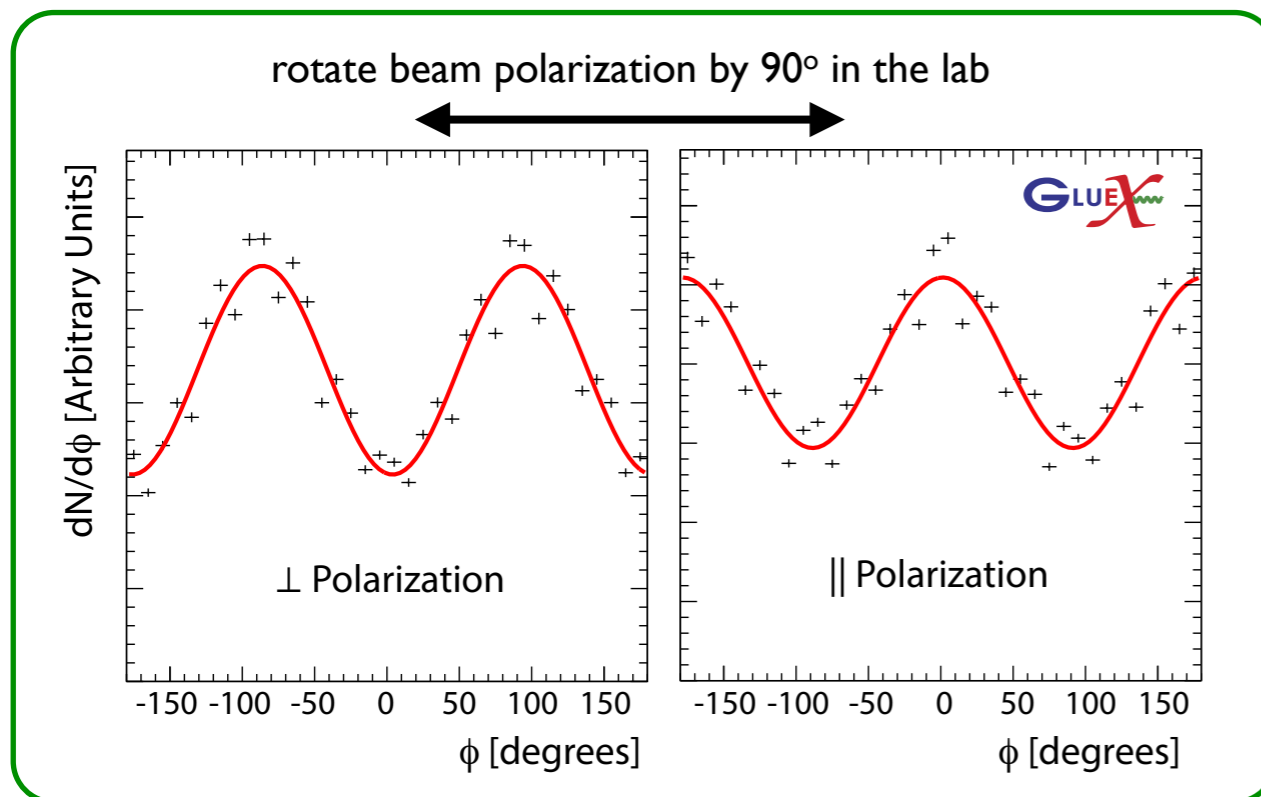
- Goals
 - final detector commissioning and calibration
 - commissioning computing/analysis infrastructure
 - opportunistic physics results
- Typical acquisition rate: 30 kHz with 90% live time
750 MB/s data acquisition
- Approximate data volume to date: 250 TB



Polarization Analysis

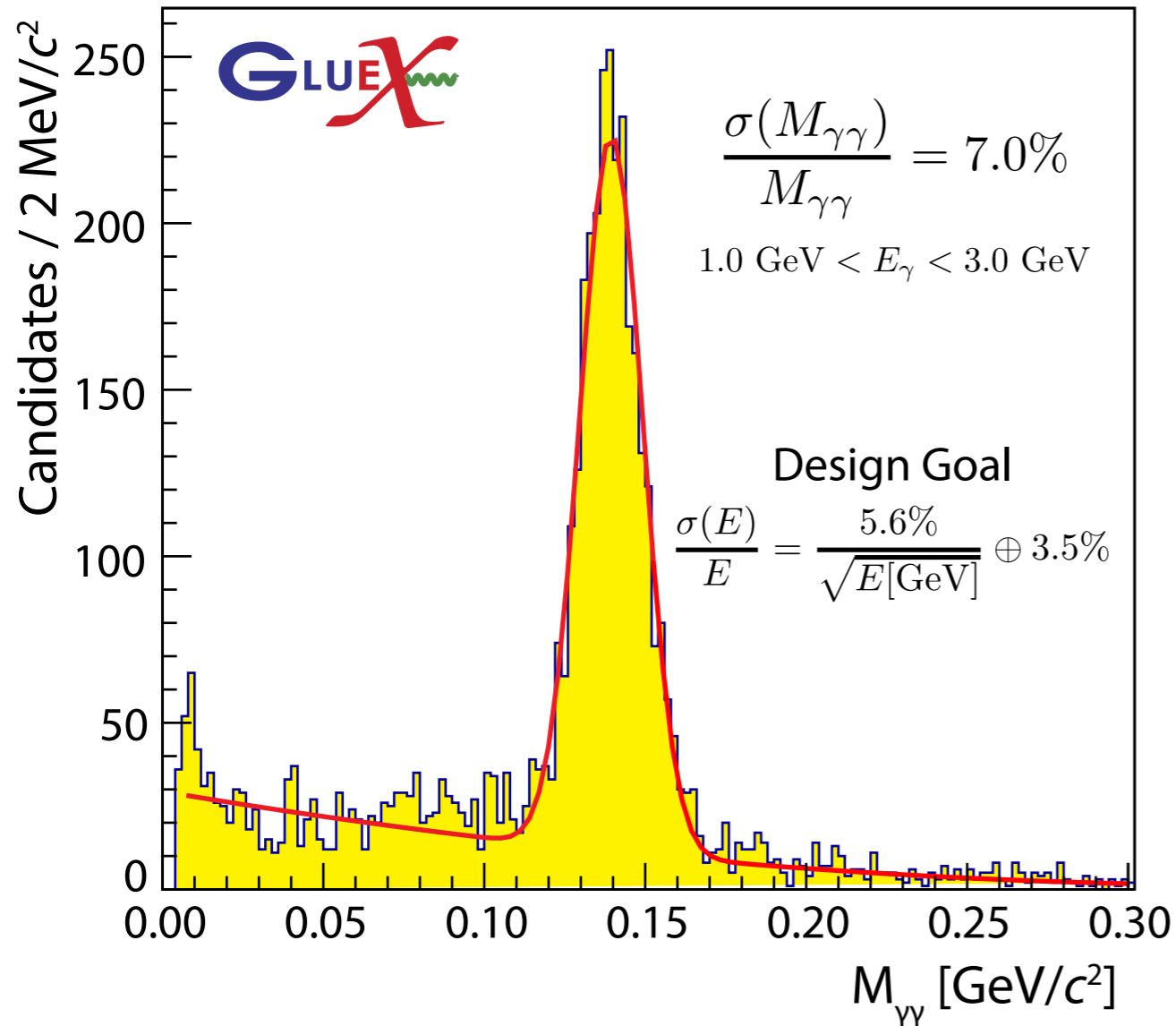


Asymmetry Amplitude is ρ Polarization
 Data confirm high polarization transfer from beam to ρ

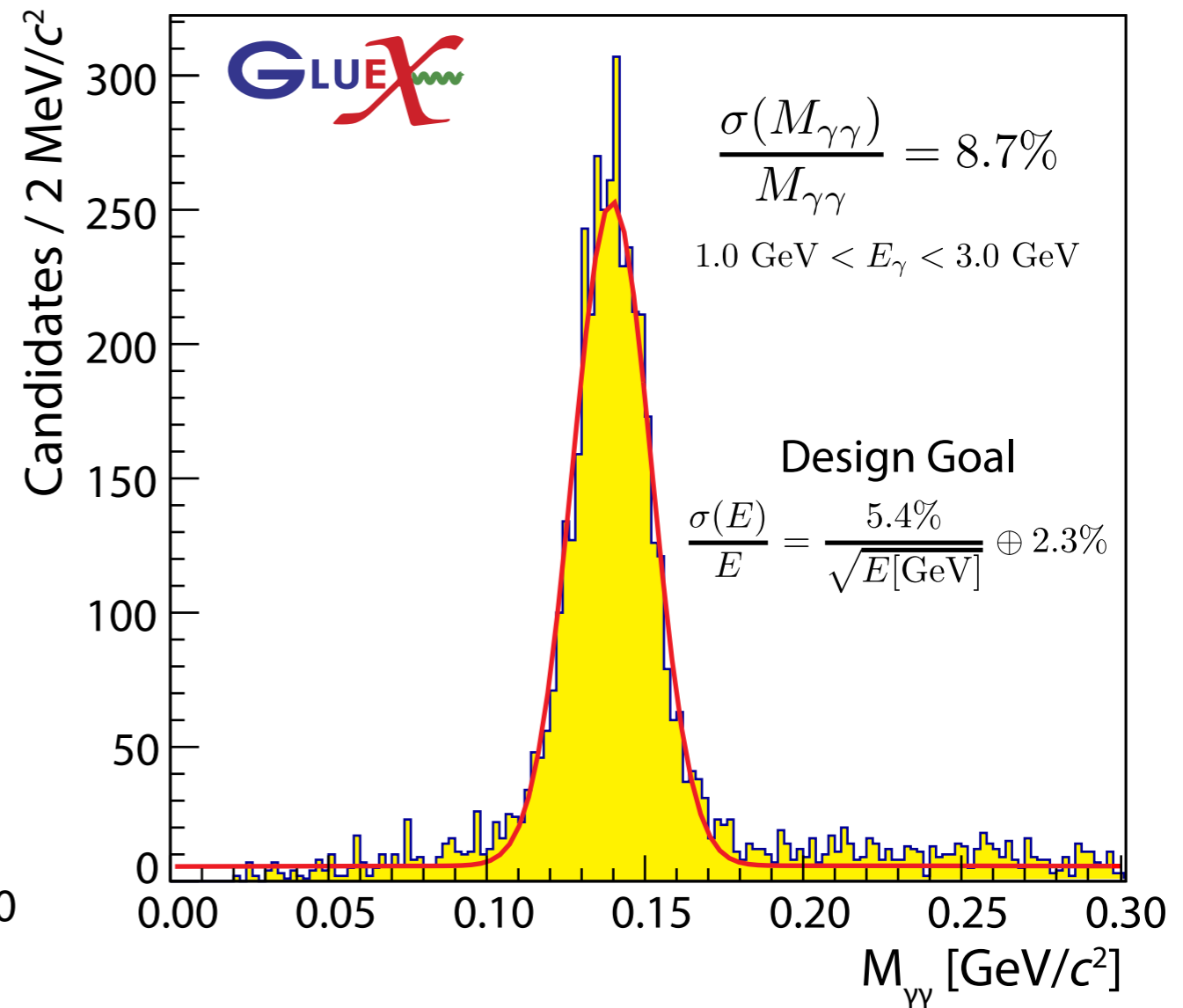


Calorimeter Performance

Forward Lead Glass Calorimeter



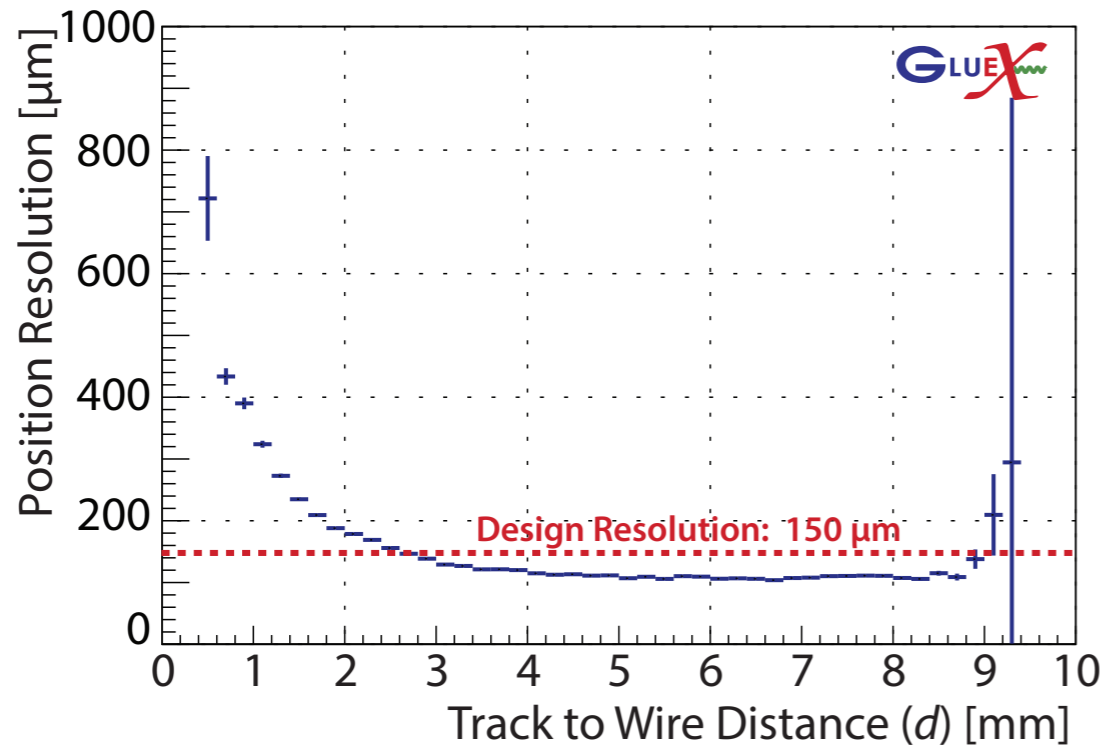
Barrel Lead-Scintillating Fiber Calorimeter



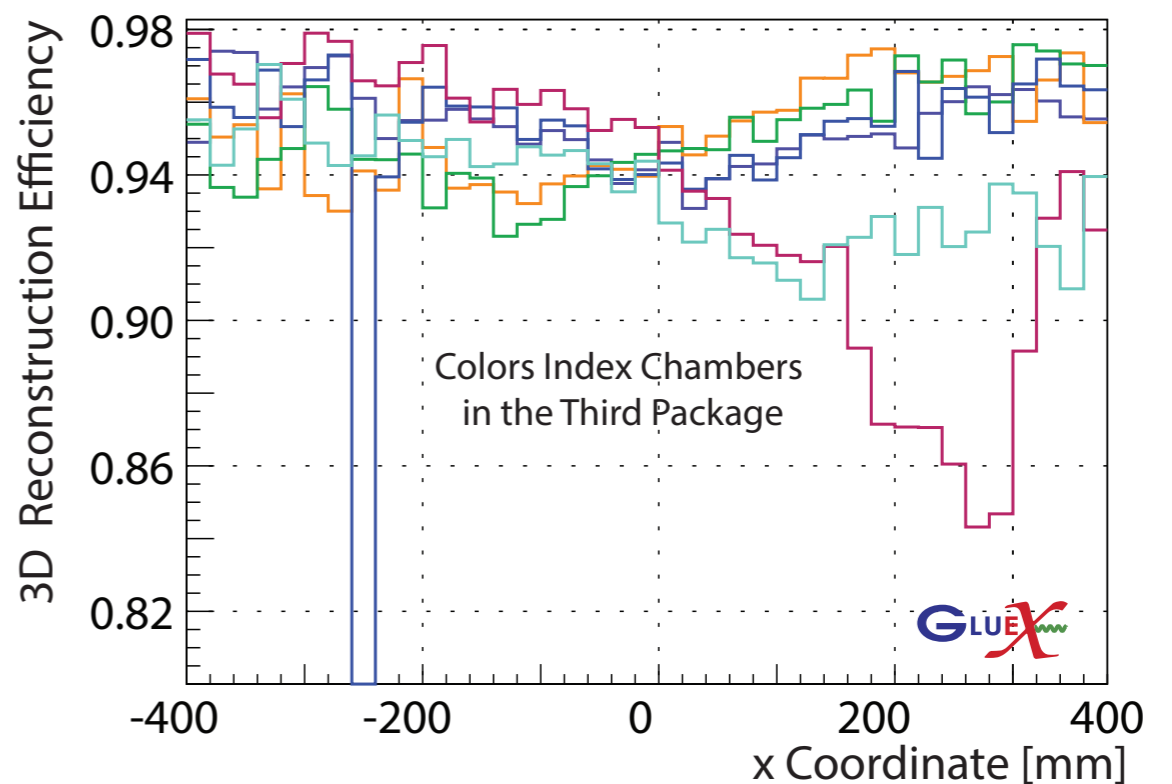
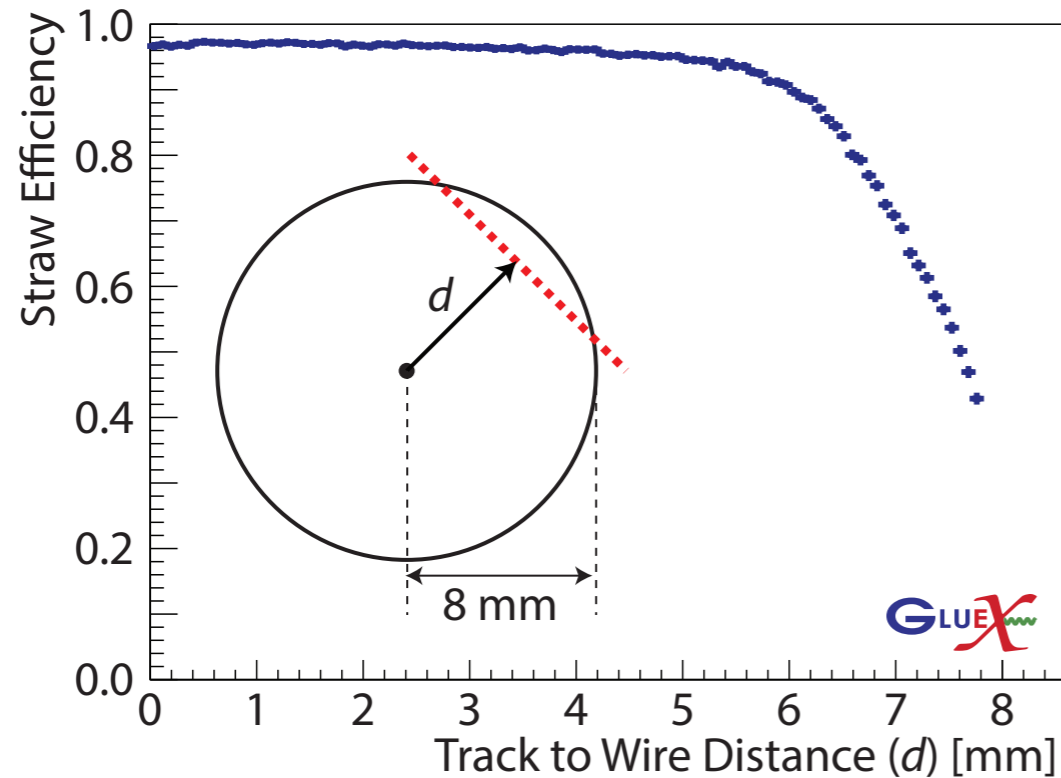
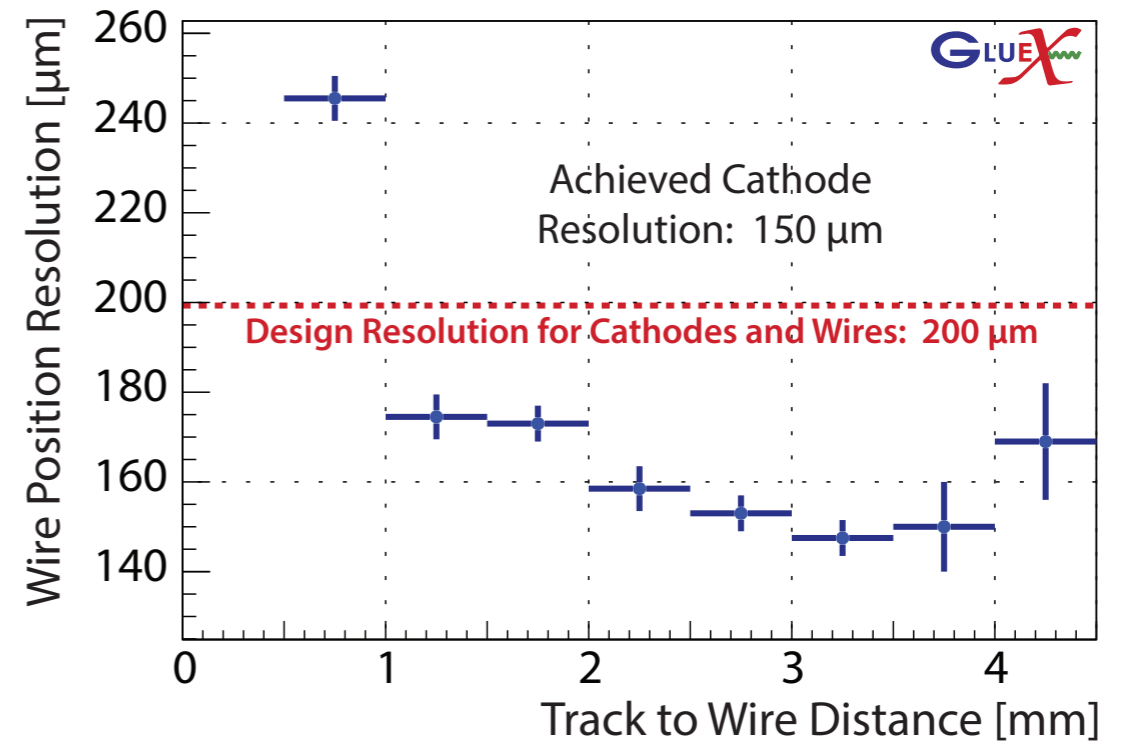
(Measured using exclusive $\gamma p \rightarrow 4\gamma p$ events.)

Tracking Performance

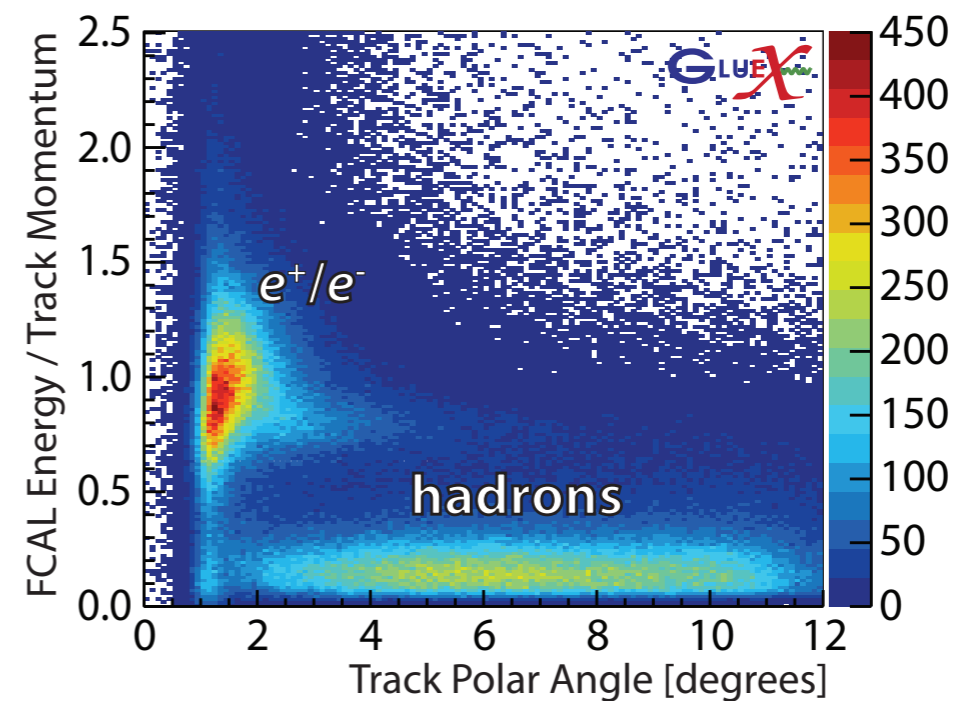
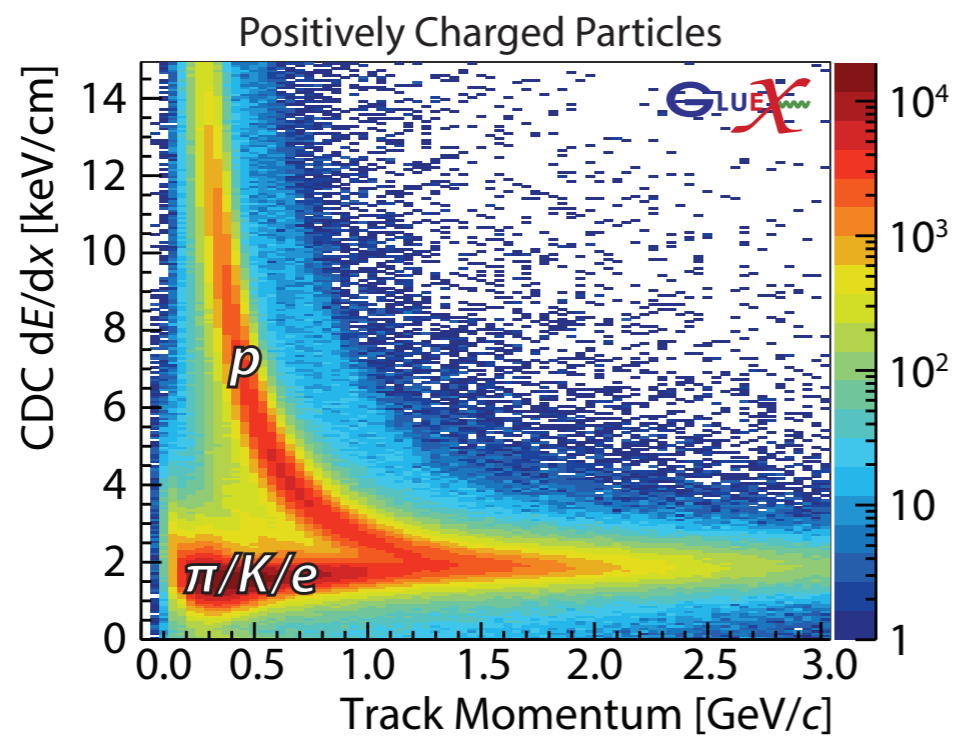
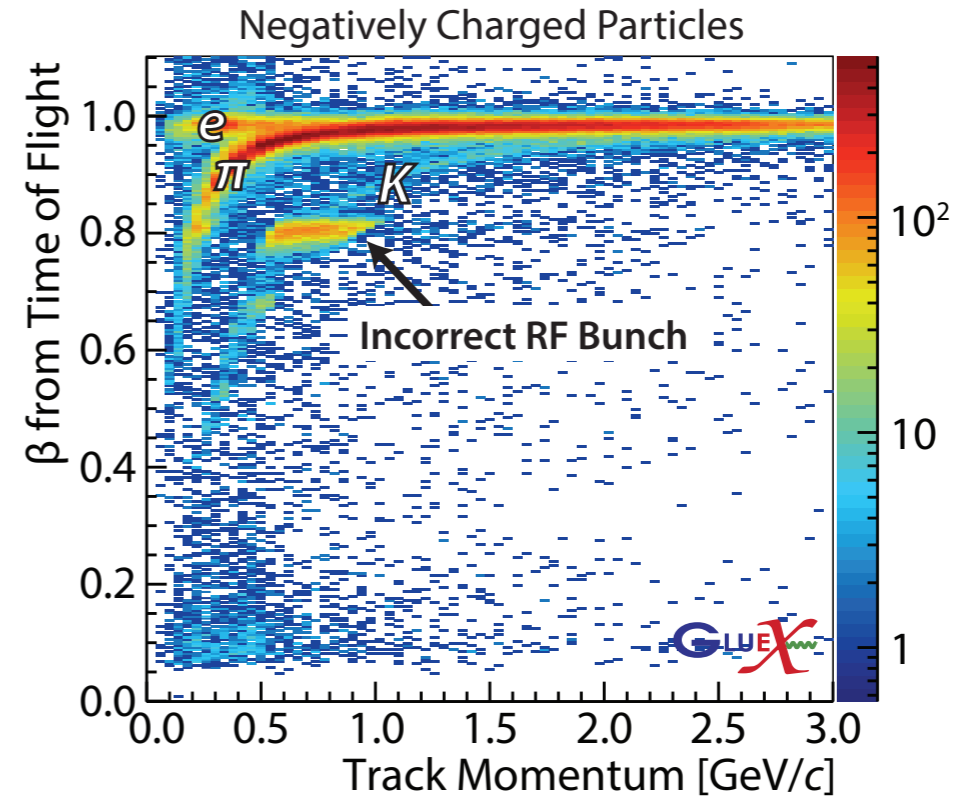
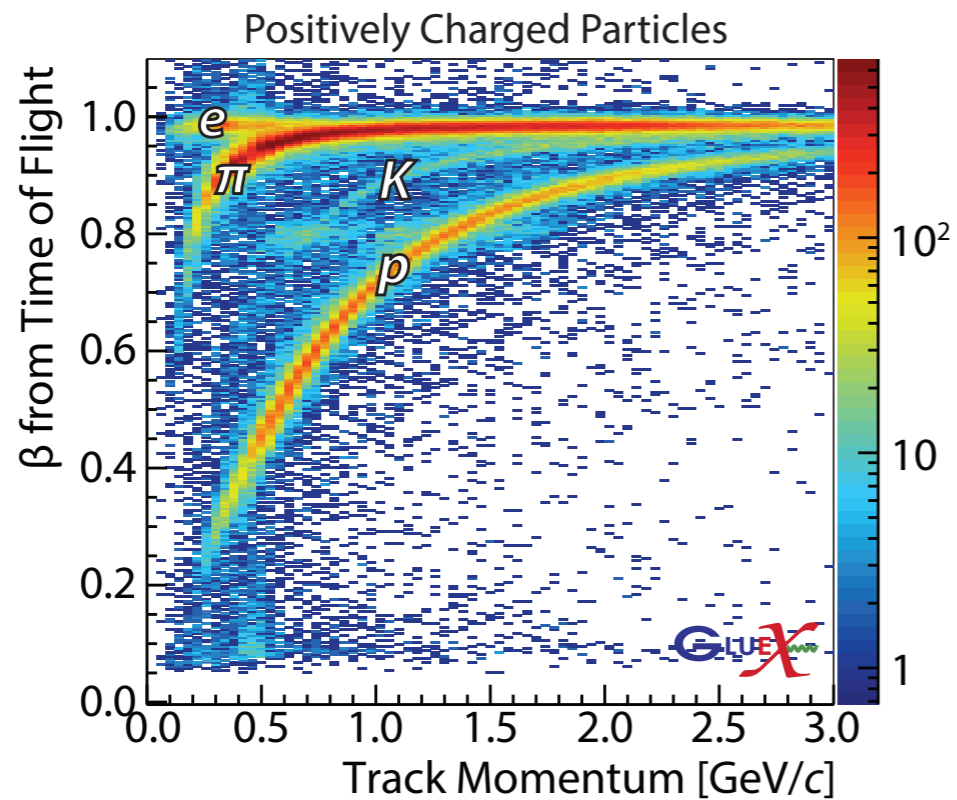
Central Drift Chamber (CDC)



Forward Drift Chamber (FDC)



Particle Identification Capability

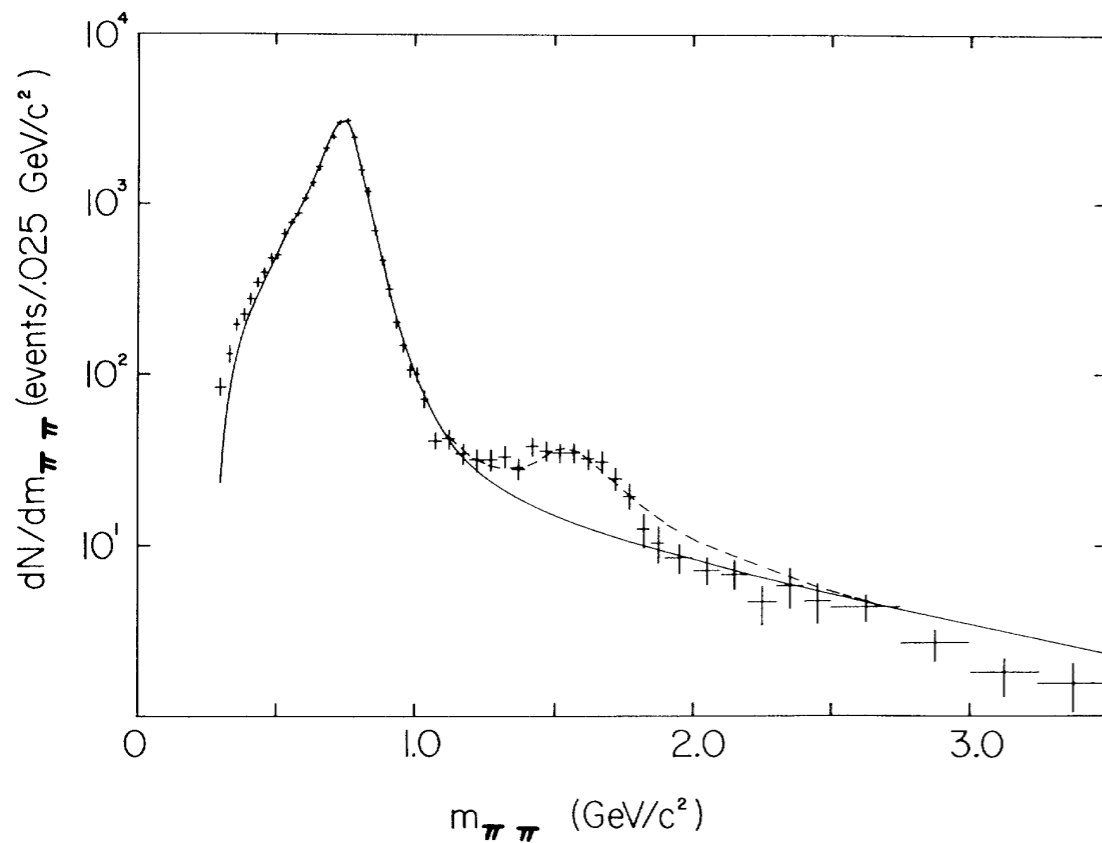


$\gamma p \rightarrow \pi^+ \pi^- p$

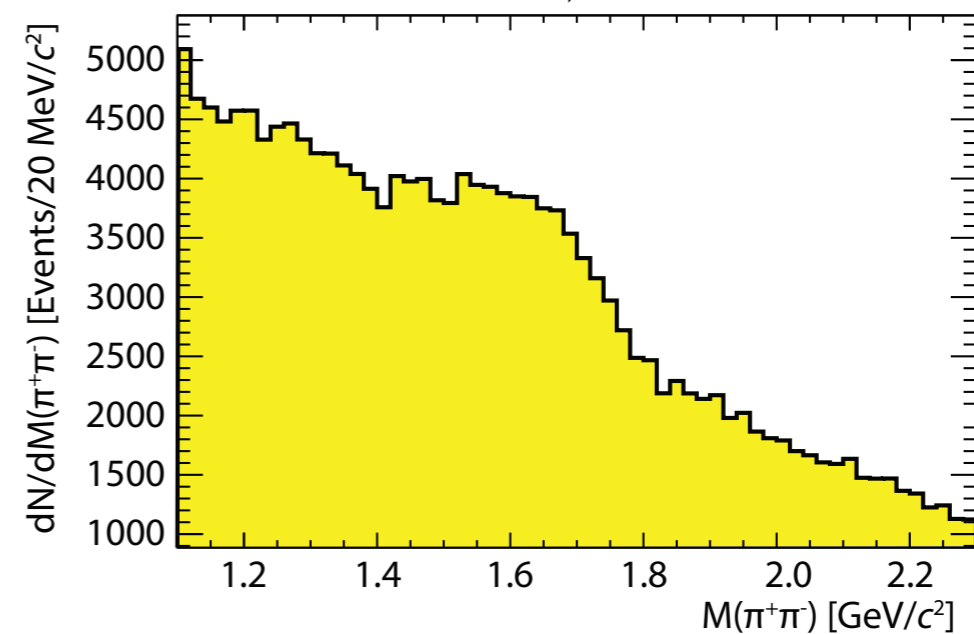
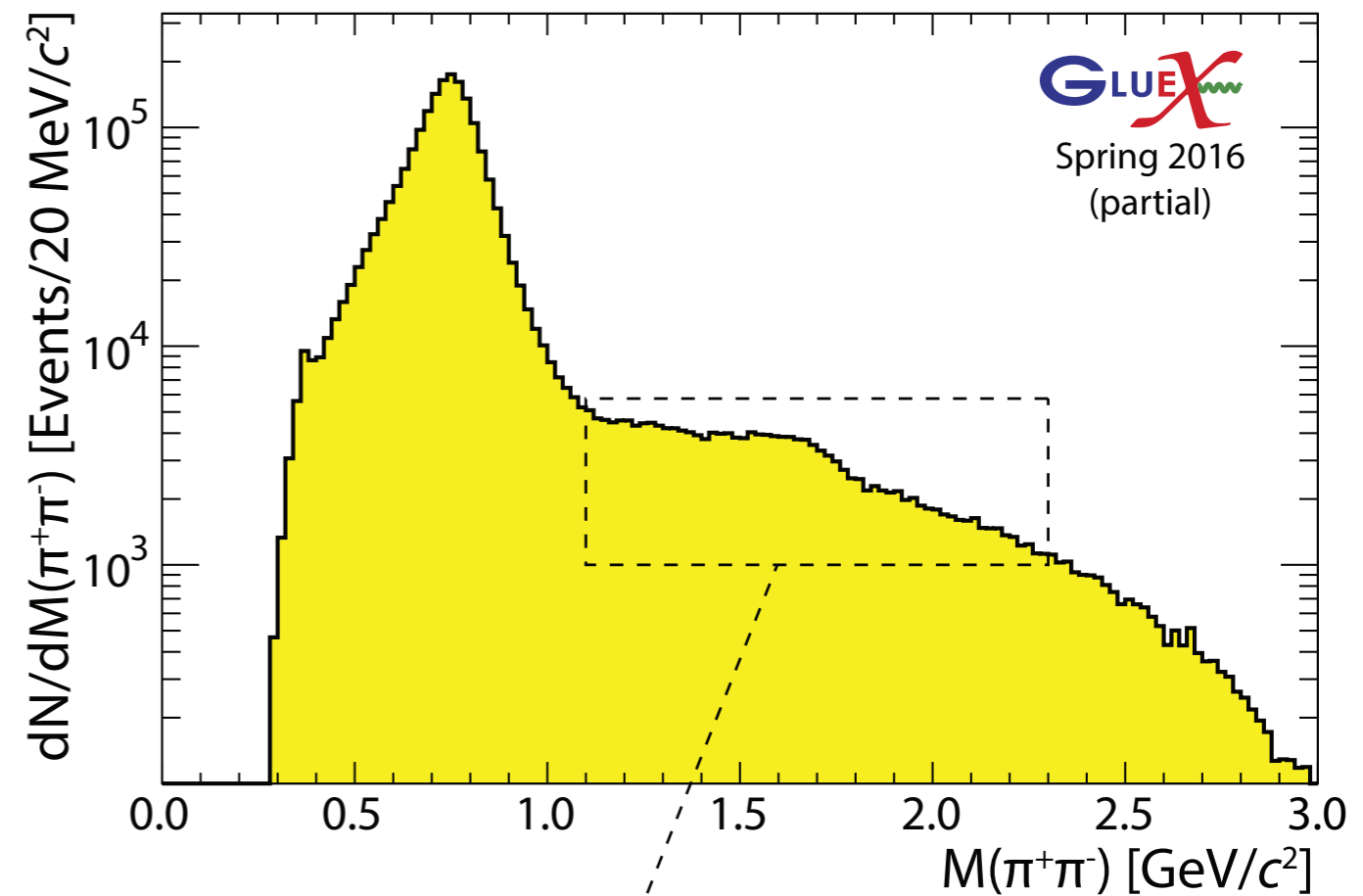
8.4 - 9.0 GeV
Polarized γ

$\gamma p \rightarrow \pi^+ \pi^- p$

SLAC Hybrid Facility Photon Collaboration
20 GeV Polarized γ



K. Abe *et al.*, PRL 53, 751 (1984)



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M. R. Shepherd
APS April Meeting
April 16, 2016



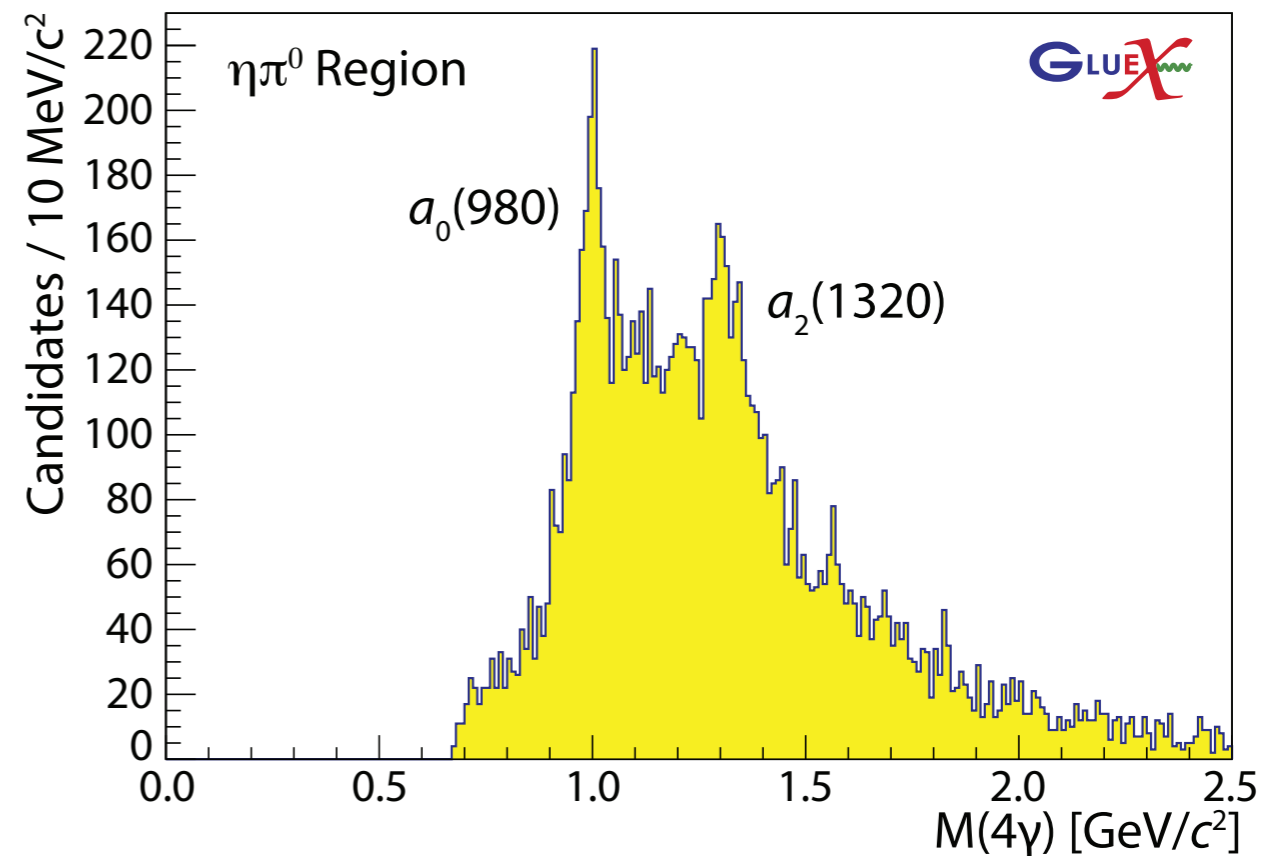
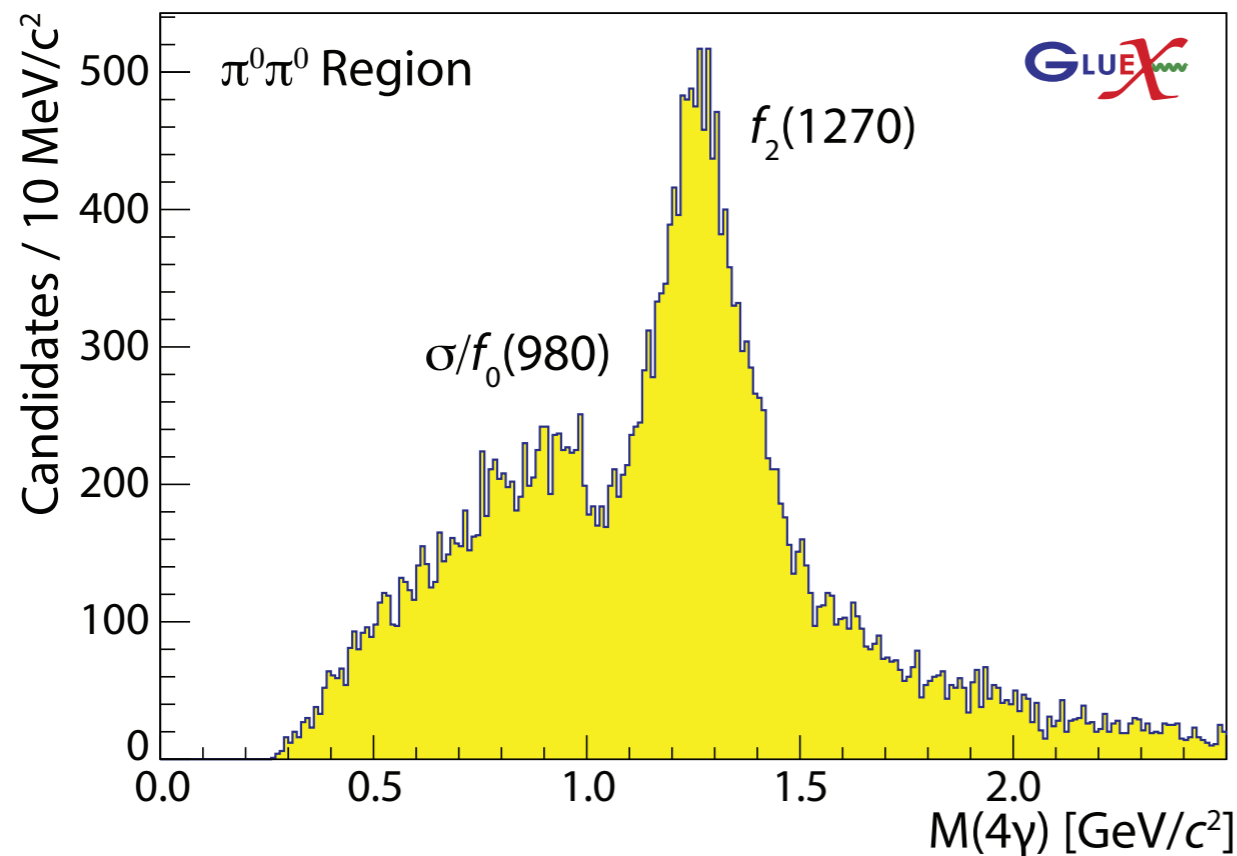
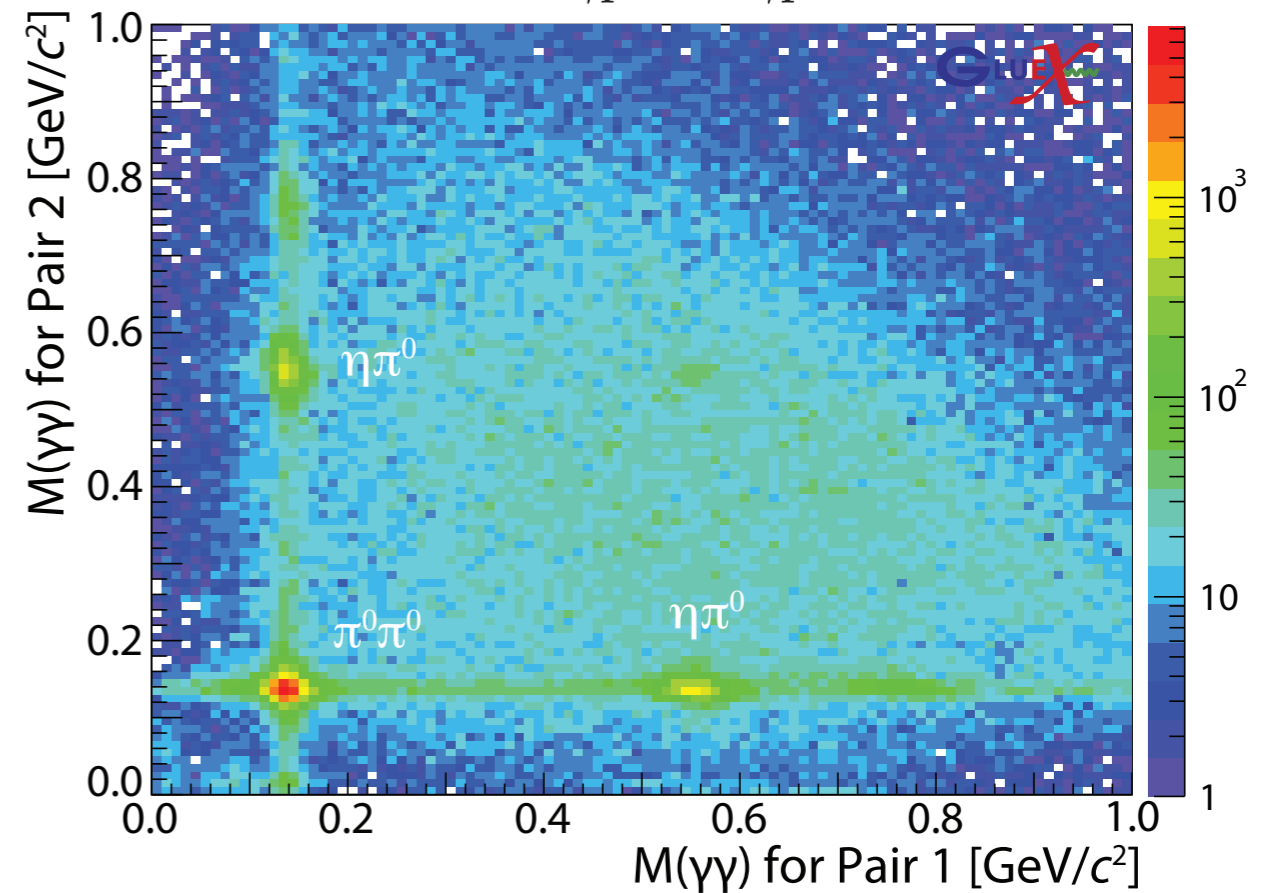
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$\gamma p \rightarrow 4\gamma p$

- Very little data exist (until now) on photoproduction of mesons that decay into multiple neutral particles
- Plots integrate over all available beam photon energies (3.0 GeV - 11.7 GeV)

$$\gamma p \rightarrow 4\gamma p$$



Summary and Outlook

- Hall D beamline is operating at design energy and intensity for initial phase of GlueX
- Most GlueX subsystems are operating at design resolution
- Unique features of the GlueX experiment are evident already
 - high statistics
 - large acceptance, especially for photons
- At least an order of magnitude more data will be collected during first physics run in 2016-2017

