

Hall D Status

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Physics Program

Proposal/ experiment	Sta- tus	Title	Beam days	PAC #
E12-06-102	A	Mapping the Spectrum of Light Quark Mesons and Gluonic Excitations with Linearly Polarized Photons	120	30
E12-10-011	A-	A Precision Measurement of the eta Radiative Decay Width via the Primakoff Effect	79	35
E12-13-003	A	An initial study of hadron decays to strange final states with GlueX in Hall D	200	40
E12-13-008	A-	Measuring the Charged Pion Polarizability in the $\gamma\gamma \rightarrow \pi^+\pi^-$ Reaction	25	40
C12-12-002	A	A study of meson and baryon decays to strange final states with GlueX in Hall D	220	42
C12-14-004	C2	Eta Decays with Emphasis on Rare Neutral Modes: The JLab Eta Factory(JEF) Experiment		42
LOI12-15-001 LOI12-15-006		Physics with secondary K_L^0 beam ω -production on nuclei		43 43

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LQ12-15-001		Physics with secondary K_L^0 beam		43
LQ12-15-006		ω -production on nuclei		43

Workshop KL2016 JLab 2016 Feb 1-3

Workshop planned for 2016

The Hall D/GlueX collaboration

23 institutions; about 110 scientists

Since the last UGBOD meeting in Jun 2015

Joined:

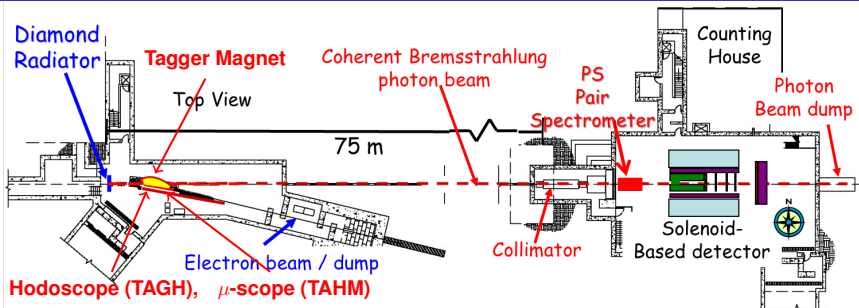
- George Washington University
- GSI

Scientific Staff: 14

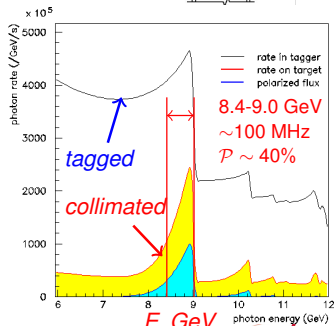
New hires:

- Postdoc position offered

Beamline



- 12 GeV e^- beam 0.05 – 2.2 μ A
- 20 μ m diamond: coherent $< 25 \mu$ rad
- Collimation $r < 1.8$ mm at ~ 80 m
- Coherent peak 8.4 – 9.0 GeV $P \sim 40\%$
2.2 μ A \Rightarrow 100 MHz γ
- Energy/polarization measured:
 - $\sigma E/E \sim 0.1\%$ (tagger), 0.5% (PS)
 - Pair spectrometer: spectrum $\Rightarrow \sigma P/P \sim 5\%$
 - Triple polarimeter $\sigma P/P \sim 3\%$



Hall D/GlueX Spectrometer and DAQ

GLUEX

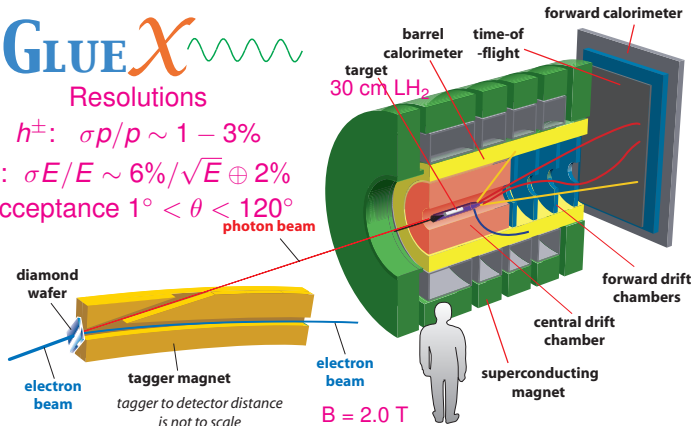
Resolutions

$$h^\pm: \sigma p/p \sim 1 - 3\%$$

$$\gamma: \sigma E/E \sim 6\%/\sqrt{E} \oplus 2\%$$

$$\text{Acceptance } 1^\circ < \theta < 120^\circ$$

photon beam



Detectors

- ▶ CDC, FDC
- ▶ BCAL, FCAL
- ▶ TOF, ST

Plans to add

- ▶ 2017 L3
- ▶ 2018 DIRC

Photoproduction γp 15 kHz for a 100 MHz beam

Beam 10 MHz/GeV: inclusive trigger 20 kHz \Rightarrow DAQ \Rightarrow tape

Beam 100 MHz/GeV: inclusive trigger 200 kHz \Rightarrow DAQ \Rightarrow L3 farm \Rightarrow tape

Status of the equipment

Practically all the equipment for GlueX-I has been installed and commissioned at some level!

Still to be installed/replaced/commissioned:

- Tagger microscope: about 30% of the fibers have low efficiency - they will be replaced in summer 2016.
- Total absorption counter (for beam flux calibration) - not commissioned in the beam yet
- Triple polarimeter for the photon beam ($\gamma + e^- \rightarrow e^+ e^- + e^-$): not fully commissioned yet
- Thin diamond radiators for the physics running (20 μm thick) still to be manufactured and installed (first item will be measured at CHESS in February 2016)

Solenoid Status

- 1500 A - nominal current (based on SLAC experience)
- 1350 A - optimal for GlueX
- The magnet was not supposed to quench. However, it did, at:
 - ▶ 1460 A May 2013
 - ▶ 1300 A May 2015
- Several reviews (last July 2015) and discussions with experts:
 - ▶ Reviews: no clear explanation found. Most probably - a problem with the cooling system
 - ▶ Oct 2015 - a SLAC expert found a difference between the SLAC and the JLab cooling implementations: JLab missed the thermosyphon effect
- 2015 Oct-Dec - modifications to the cooling system in order to reproduce the SLAC configuration. Expected to finish cooldown by Feb 5 2016.

Commissioning runs

- *2014 Fall*

- ▶ 10 GeV, \sim 17 days of beam
- ▶ Initial commissioning of the beamline and detector

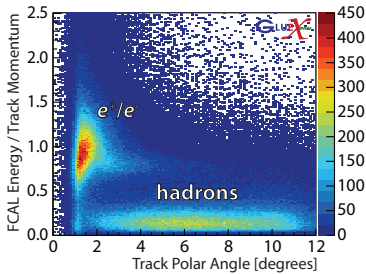
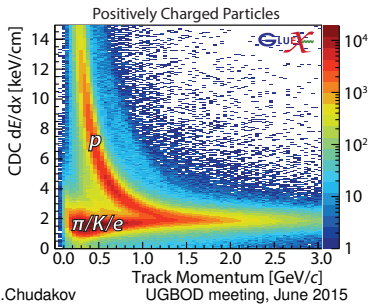
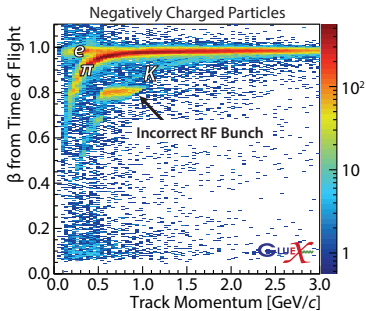
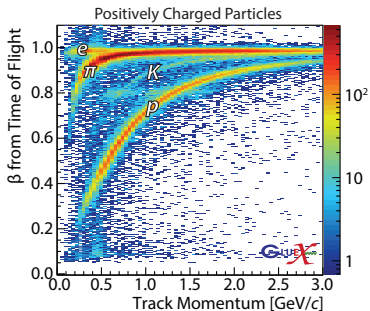
- *2015 Spring*

- ▶ 5.5 GeV, \sim 5 days of beam
- ▶ Commissioning of the coherent Bremsstrahlung beam (0.05 mm diamond radiator)
- ▶ Progress with other systems

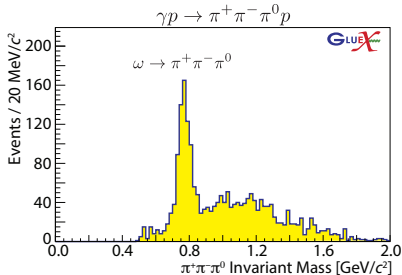
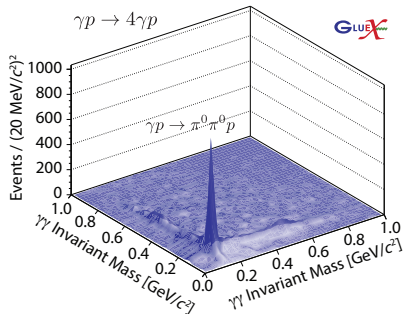
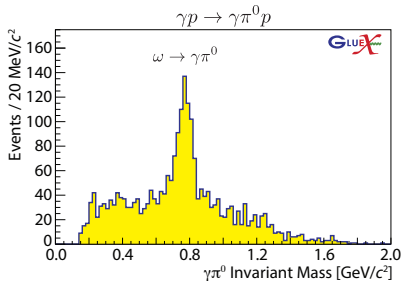
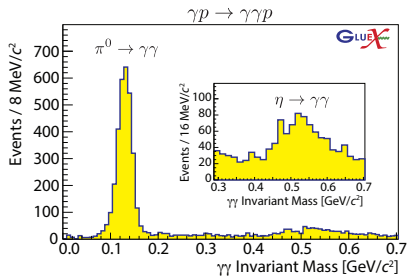
- *2015 Fall*

- ▶ 12 GeV, \sim 2 days of beam
- ▶ Accelerator work on the beam instrumentation
- ▶ Some progress with the DAQ and trigger

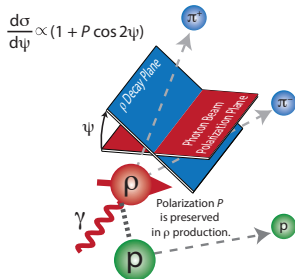
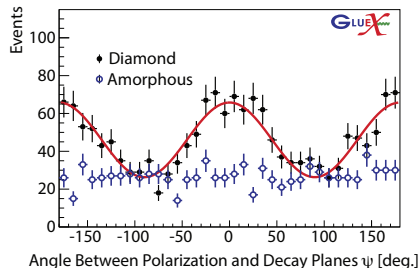
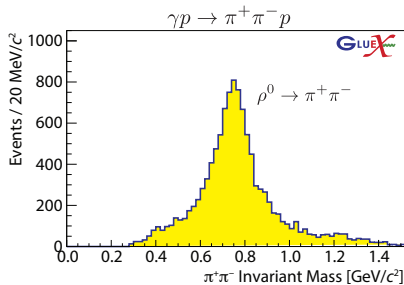
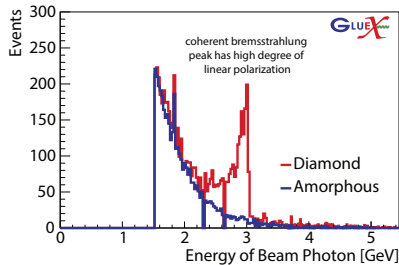
Commissioning results from 2015: PID

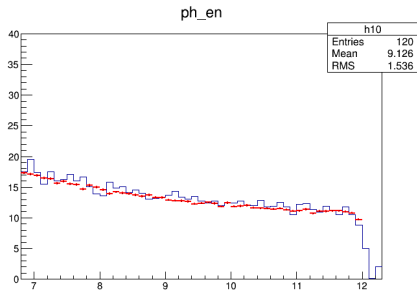


Commissioning results from 2015: Signals

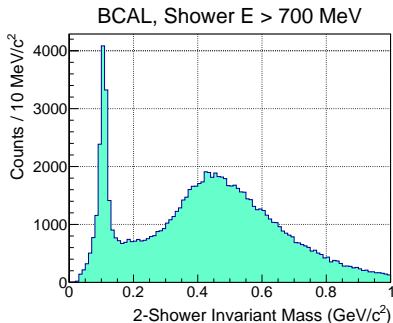


Results from 2015: Linearly Polarized Beam





12 GeV-endpoint beam spectrum from the PS



Online monitoring spectra for BCAL

Other results

- DAQ: > 20 kHz readout rate achieved (needed for GlueX-I)
- Trigger: progress, close to the GlueX-I requirements

Plans for the 2016 Spring run

- Schedule: Feb 4 - Apr 13, 12 GeV
- Accelerator: finish the beam instrumentation (fast feedback) commissioning
- Solenoid: 1200 A
- Commissioning of TAC, new diamond radiator, triple polarimeter
- Regular data taking:
 - ▶ Finish the calorimeter calibration
 - ▶ Physics commissioning: aim at producing “early” results, mostly on various polarization effects, using the linearly polarized beam