

# Hall D Status

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Hall D Group Leader

KLF ERR-2, Aug 2024

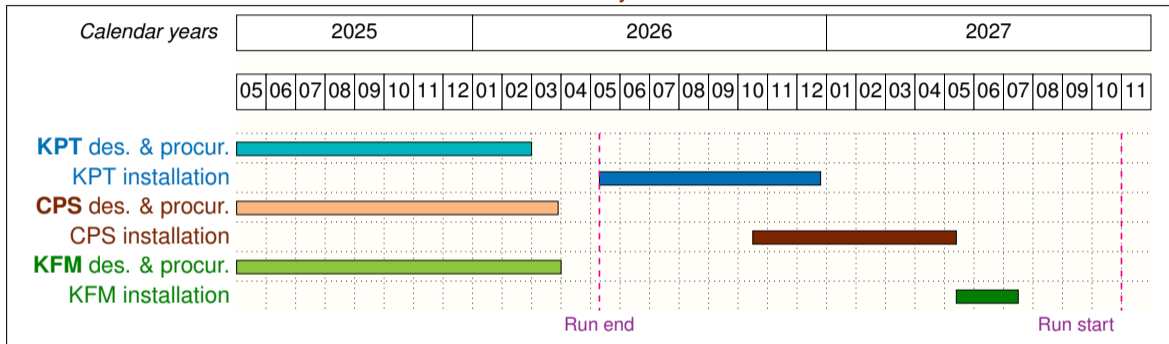
# Physics Program in Hall D

Experiment	name	Title	PAC rating	PAC days	data taken
E12-06-102	GlueX-I	Mapping the Spectrum of Light Quark Mesons and Gluonic Excitations with Linearly Polarized Photons	A	120	100%
E12-12-002 A	GlueX-II	A study of meson and baryon decays to strange final states with GlueX in Hall D	A	220	46%
	JEF	Eta Decays with Emphasis on Rare Neutral Modes: The JLab Eta Factory(JEF) Experiment	Grp	100	0%
E12-10-011	PrimeX- $\eta$	A Precision Measurement of the eta Radiative Decay Width via the Primakoff Effect	A-	79	100%
E12-13-008	CPP/NPP	Measuring the Pion Polarizability in the $\gamma\gamma \rightarrow \pi\pi$ Reaction	A-	25	100%
E12-19-003	SRC/CT	Studying Short-Range Correlations with Real Photon Beams at GlueX	B+	15	100%
<i>Not yet scheduled</i>					
E12-19-001	KLF	Strange Hadron Spectroscopy with Secondary KL Beam in Hall D	A-	200	
E12-20-011	REGGE	Measurement of the high-energy contribution to the Gerasimov-Drell-Hearn sum rule	A-	33	
E12-24-006	GlueX-III	Photoproduction of Charmonia at High Luminosity	A	200	

- considerable installation / new equipment required
  - finished data taking
- KLF - big overhead: requires 2 years for installation and de-installation

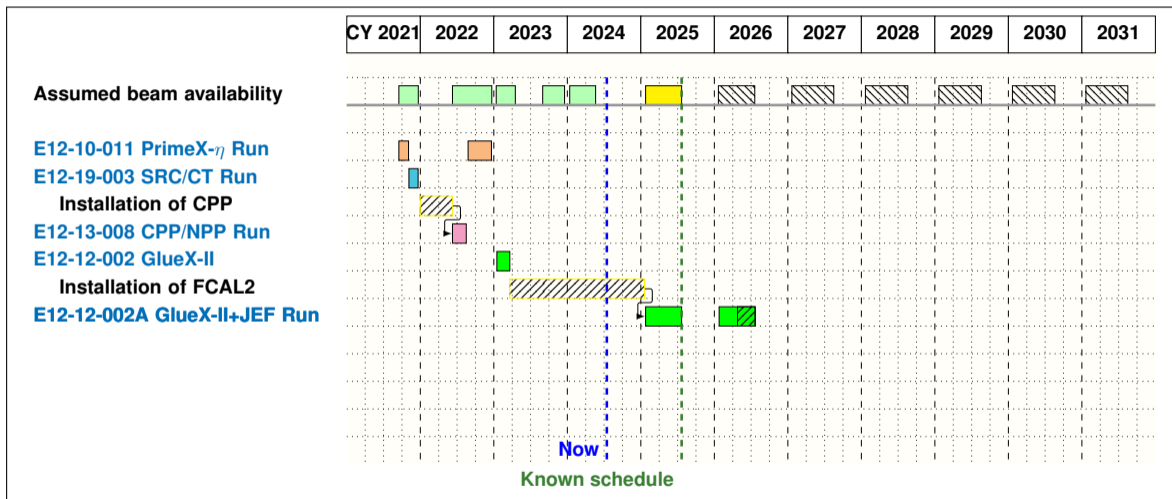
# KLF installation schedule

Installation schedule by Tim Whitlatch



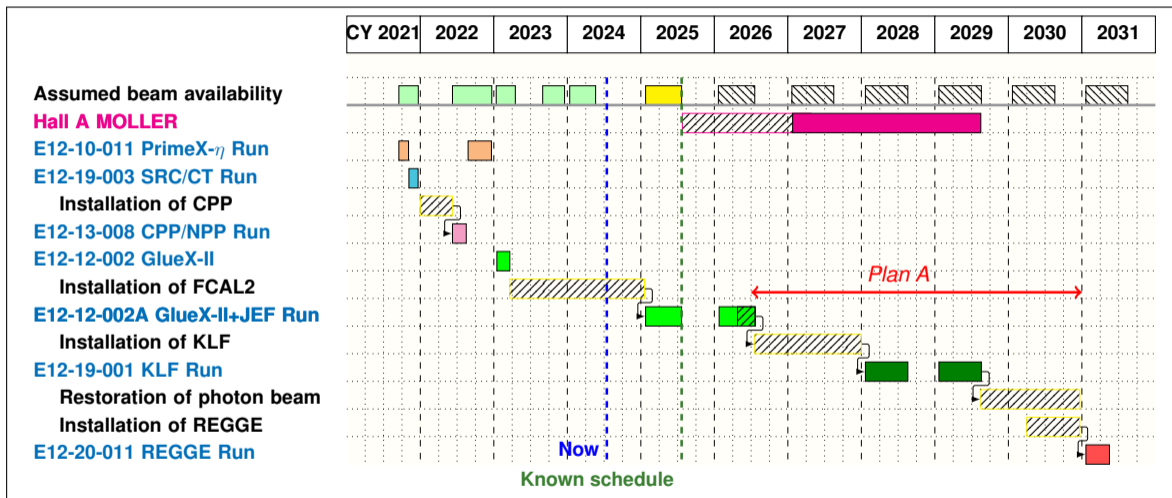
- Design and procurement phases have started in FY24, can end earlier with additional ME, MD manpower
- The run start and end are provisional

# Hall D running schedule: outlook



- Assuming 25 weeks/year running in FY25 and FY26 and 30 weeks/year afterwards
- Assuming KLF timely budgeted and pass ERR by mid of 2025
- Assuming KLF compatibility with MOLLER, 64 ns duty cycle is likely OK, 128 ns is uncertain yet

# Hall D running schedule: outlook

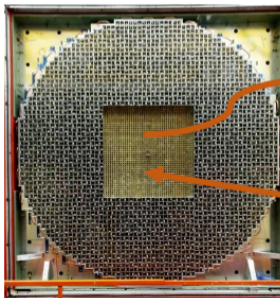


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# Ongoing projects: a major upgrade of the Forward Calorimeter FCAL

## FCAL2 PbWO<sub>4</sub> insert: Installation

- Replacement of 400 lead glass blocks (out of 2800) with 1600 PbWO<sub>4</sub> crystals
- Twice better energy and spacial resolution, much better radiation hardness
- Required for the JEF experiment (to run with GlueX-II in 2025-2026)
- Installation is in progress, to be ready by 2025



Removed  
400 lead glass  
modules



Inserted  
1600 PbWO<sub>4</sub>  
modules

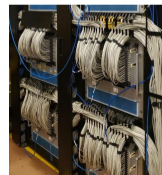
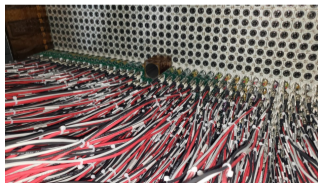
LG cabling done



LMS for crystals

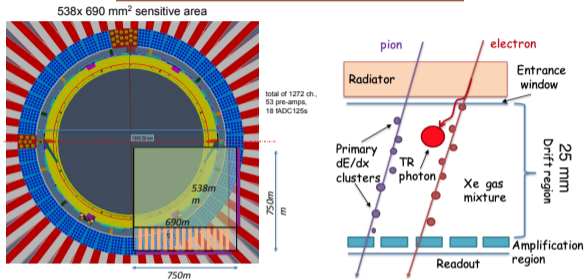


Installation of the bases for crystals and cabling



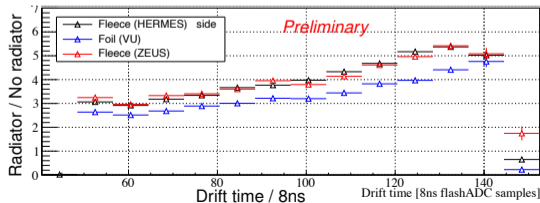
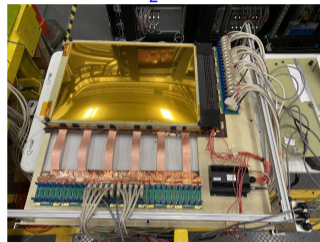
# Ongoing projects: hardware development for GlueX-III

## GEM TRD: prototyping and testing

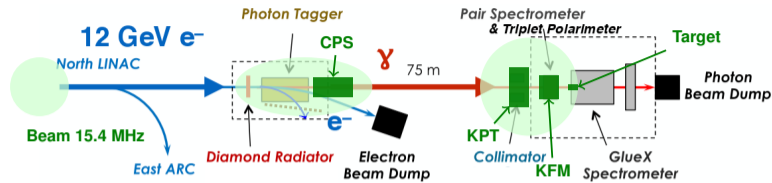


- Goal: additional PID for electrons and positrons, pion suppression  $\sim 10$  at  $\sim 90\%$  electron efficiency  
Acceptance  $\theta < 10^\circ$  - in front of DIRC
- Small prototypes tested with  $e^-$  and  $\pi^\pm$
- Prototype of 25% of area is being tested
- Electronics: for tests using FADC125 MHz spares  
For the full project: VPX-based FADC, PANDA design
- Xe purification system is under development
- **Potential completion: by the end of 2026**

**GEM TRD: prototype 1/4 of the full area**  
Run: Mar 12-15; electrons in Pair Spectrometer  
used 90/10% Kr/CO<sub>2</sub> and different radiators



# KPF(KLONG) experiment: preparations status



## KLF installation

1. CPS - Compact Photon Source
2. KPT - Kaon Production Target
3. KFM - Kaon Flux Monitor
4. Target of a larger diameter
5. Injector 4 ns  $\rightarrow$  64 ns

## Status of the major components

- CPS: Engineering design is advanced
- KPT: Engineering design is (nearly) complete
- KFM: Non-magnetic design is assumed  
Detectors from Jülich to be transported to JLab in 2024
- Beam duty cycle: compatibility with MOLLER not yet fully tested

## Changes, developments and requests

- Photon beam option for calibration: affects the CPS and KPT design
- Methods and equipment to control the beam (tune, FSD...)
- Requests for a parasitic experiment with emulsions  
A new platform needed and other equipment

## Capital budget and procurements in FY24

- Obligated \$200k power supply for the CPS magnet
- PR sent \$100k CPS magnet
- PR sent \$65k 1200 painted lead bricks for KPT, CPS

- 3100 free lead bricks, painted (on DOPS)

## Reviews and readiness

- ERR-I (Aug 2, 2023) on the conceptual design  
Recommendations: 2 left to meet
- ERR-II (Aug 29-30) on data analysis and software
- ERR-III (Summer 2025?) Final readiness review