

For PAC47 Submission

May 7<sup>th</sup>, 2019

[<https://misportal.jlab.org/pacProposals/proposals/new>] Firefox is favorite

#### New Proposal

Proposal Cover Sheet (PAC 47)

Proposal Type: **New Proposal**

#### Basic Information

Physics Category: **The Hadron Spectra as probes of QCD**

Title: **Strange Hadron Spectroscopy with Secondary KL Beam in Hall D**

Days Requested for Approval: **200**

Experiment Halls: **D**

Approved, Conditionally Approved, and/or Deferred Experiment(s) or proposals:

**Deferred Experiment PR12-17-001.**

**Deferred Experiment PR12-18-002.**

#### Collaboration-Approved Proposals:

If you will be running in parallel with an approved experiment, please indicate the experiment number:

**Our experiment cannot run in parallel with accepted experiments by PAC**

Author List: <uploaded>

#### Contact Us

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#### Major Installations

Equipment:

- + **GlueX**
- + **New Compact Photon Source will be located downstream of the tagger magnet**
- + **New Be-target Assembly will be located at the beginning of the collimator cave**
- + **New Flux Monitor will be located downstream the Pair Spectrometer magnet and upstream Pair Spectrometer shielding wall**
- + **Replace a cryogenic target cell**

Support Structures:

- + **Add two concrete walls inside the collimator cave**
- + **Add new vacuum beam pipe between Be and cryogenic targets**
- **Remove two collimators from the collimator cave**
- **Remove detectors of the Pair Spectrometer**
- + **Add support structure for the Be target assembly**
- + **Add support structure for the Flux Monitor**
- + **Add support structure for the Compact Photon Source**
- + **Add the pulse picking system and the laser amplifier for a beamline delivery system**

+ Add the beam rastering system will be installed in the Hall D electron beam line

**Data Acquisition/Reduction:**

Support Structures: **GlueX**  
Software: **GlueX**

**Major Equipment:**

Magnets: **GlueX & CPS & Flux Monitor**  
Power Supplies: **GlueX & CPS & Flux Monitor**  
Detectors: **GlueX & Flux Monitor**  
Electronics: **GlueX & Flux Monitor**  
Computer Hardware: **GlueX**

**Other Resources:**

- + Add cooling system for the Compact Photon Source
- + Add cooling system for the Flux Monitor
- + Add cooling system for the Be-target Assembly
- + Add motion system for the Be-Target

**Beam Requirement List**

Beam Energy(MeV)	Mean Beam Current( $\mu$ A)	Polarization and Other Requirements
<b>12000</b>	<b>5</b>	<b>64 ns repetition</b>
Est Beam-On Time(hours)	Target Materials	<b>&amp; Thickness</b>
<b>4800</b>	Liquid Deuterium	<b>&amp; 6496 (mg/cm<sup>2</sup>)</b>
	Liquid Hydrogen	<b>&amp; 2834 (mg/cm<sup>2</sup>)</b>
	Beryllium	<b>&amp; 73735 (mg/cm<sup>2</sup>)</b>
	Copper radiator (10% r.l.)	<b>&amp; 1281 (mg/cm<sup>2</sup>)</b>
	Tungsten photon beam absorber	<b>&amp; 193000 (mg/cm<sup>2</sup>)</b>

**Hazard Identification Checklist**

**Cryogenics:**

Beamline Magnets  
Analysis Magnets  
Target Magnets  
Type: **Liquid hydrogen, liquid deuterium**  
Flow Rate: **N/A**  
Capacity: **N/A**

**Electrical Equipment:**

Cryo/Electrical Devices:  
Capacitor Banks:  
High Voltage: **Yes**  
Exposed Equipment:

Radioactive materials: **N/A**

**Pressure Valves:**

Inside Diameter: **N/A**  
Operating Pressure: **Existing pressure relief valves on the cryogenic target system**  
Window Material: **N/A**  
Window Thickness: **N/A**

Special Target Materials: **Deuterium**

Flammable:

Type: **Hydrogen & deuterium**  
 Flow Rate: **N/A**  
 Capacity: **N/A**  
**Drift Container:**  
 Type: **N/A**  
 Flow Rate:  
 Capacity:  
**Other Target Materials:**  
**Beryllium**  
**Liquid Hydrogen**  
**Tungsten**  
**Copper**  
**Vacuum Vessels:**  
 Inside Diameter  
 Operating Pressure: **Existing target vacuum vessels**  
 Window Material:  
 Window Thickness:  
**Radioactive Sources:**  
 Permanent Installment  
 Temporary Use  
 Type: **N/A**  
 Strength  
**Larger Mechanical structure:**  
 Lifting Devices  
 Motion Controllers  
 Scaffolding  
 Elevated Platforms  
**Lasers:**  
 Type: **N/A**  
 Wattage  
 Class  
**Hazardous Materials:** **N/A**  
**General:**  
 Base Equipment: **Yes**  
 Temp. Mod. To Base Equip.: **Yes**  
 Perm. Mod. to Base Equip.: **the CPS would stay there permanently (too hot to take apart)**  
**"Coll. cave" - all the equipment but the perm. magnet must be removed (not the collimators only)**  
 Major New Apparatus: **Yes**  
 Other General: **Temp. Mod. To Base Equip.: Increase the cryogenic target cell volume**  
**Temp. Mod. To Base Equip.: low bunch repetition**

**Computing Requirement List:**

Silo/Mass Storage (Tape): **700 TB**  
 Amount of Simulated Data Expected: **140 TB**  
 Amount of Raw Data Expected (TB): **230 TB**  
 Amount of Processed Data Expected (TB): **360 TB**  
 Online Storage Disk Required (TB): **50 TB**

**Imported Data Expected from Offsite Institution: 10 TB**  
**Exported Data Expected to Offsite Locations: 500 TB**

**Computing:**

**Simulation Requirements (SPEC CINT 2000hrs): 5.3Mcore-hrs (2016 farm node)**

**Production (Replay, Analysis, Cooking) Requirements (SPEC CINT 2000hrs):**  
**23M core-hrs (2016 farm node)**

**Other Requirements:**

Please add any additional information that will be useful for JLab's IT Division regarding unique configurations or that may require additional resources and/or coordination. Please indicate if possible what fraction of these resources will be provided by collaborating institutions and how much is expected to be provided by JLab. **N/A**

**Assumed Resource Requirements**

Use this section to provide any information regarding the assumed requirements for the resources needed.

**Assume standard GlueX computing workflow. Details of numbers in the requirement list calculated via GlueX computing model. See details here:**

**[https://github.com/JeffersonLab/hd\\_utilities/blob/master/comp\\_mod/KLong\\_proposal2019.xml](https://github.com/JeffersonLab/hd_utilities/blob/master/comp_mod/KLong_proposal2019.xml)**

**There are several supplemental files:**

- 1) Endorsement Letter**
- 2) Cover Letter**
- 3) New Equipment**
- 4) KPT**
- 5) KFM**
- 6) CPS-general**
- 7) CPS for Hall D**