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Status: Approved
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JSA
THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY
12000 Jefferson Avenue
Newport News, VA 23606
Phone: (757) 269-7100

Beam Schedule 61714

Run Group Name: *HPS*

Run Group's Experiments

- E12-11-006

Experiment Hall

B

What fraction of the PAC-approved runtime for your experiment is included in this request?

32%

Explain your request. This explanation should be able to guide the scheduling committee. Outline if only a fraction of the PAC-approved runtime is requested. Identify any constraints on the scheduling of your experiments (e.g. periods when members of the collaboration have prior commitments that would exclude their participation, or times when critical apparatus will not be available): Type your answer in the space provided below or attach a document in the attachments section at the bottom of this form.

The HPS experiment has been approved to run for 180 PAC days (15 of which have been used in the HPS Engineering Runs of 2015 and 2016) in order to search for a heavy photon (aka hidden sector photon) over a wide range of mass/coupling parameter space at energies between 1.1 and 6.6 GeV. During the HPS Engineering run in 2015-2016, we have acquired roughly 2 PAC days of production data at 1.1 GeV and about 5 PAC days at 2.2 GeV, which have demonstrated the physics readiness of HPS. Analyses of these data sets are underway. In this run period we request at total of 57 PAC days including 25 days at 2.2 GeV (1 pass) to complete the first phase of data taking at this energy, and 32 days at 4.4 GeV (2 pass) to begin the first phase of data taking at this new energy. This request includes a few days for beam setup, detector and trigger commissioning, and diagnostics in addition to extended data taking periods. This run will constitute the first contiguous running for the HPS experiment and will extend the search for heavy photons into a wide region of unexplored parameter space.

Collapse All

Appendix A

Proposed Commissioning and Run Schedule

Enter data in preferred time sequence for energies, current, targets, beam conditions, etc, for the entire Run Plan including commissioning. Under "Special Requirements" below, note all critical scheduling needs, e.g., a certain set of energies must be run before another set, etc.

NOTE: INDICATE ALL MAJOR EQUIPMENT CHANGES, BREAKS, OR MAINTENANCE DAYS, ETC. ON SEPARATE LINES.

Days	Setup Number from Radiation Budget Form	Tag No. Special Requirements (including any variance from standard beam conditions)
1	1	2.2 GeV physics quality beam at the tagger dump, establish HPS beam
1	2	2.2 GeV HPS required quality beam, <250 nA, detector and trigger commissioning
21	3	2.2 GeV HPS required quality beam, <250 nA, production data taking
2	4	2.2 GeV HPS required quality beam, <250 nA, diagnostics runs; empty target, carbon target, no-field run
1	5	4.4 GeV physics quality beam at the tagger dump, establish HPS beam

1	6	4.4 GeV HPS required quality beam, <450 nA, detector and trigger commissioning
28	7	4.4 GeV HPS required quality beam, <450 nA, production data taking
2	8	4.4 GeV HPS required quality beam, <450 nA, diagnostics runs; empty target, carbon target, no-field run

**Assume 100% efficiency for accelerator and experimental operations. ** Provide setup numbers as indicated on the Radiation Budget Form. The sum of the run days must be = the PAC-approved days. Consult Accelerator Liaison Physicist H. Areti for current beam capabilities.*

Appendix B

Proposed Apparatus or Beam Development Run Schedule

Fill in one of these forms for each proposed development activity. Enter data in preferred time sequence for energies, current, targets, beam conditions, etc, for the entire Development Run. Under "Special Requirements" below, note all critical scheduling needs, e.g., a certain set of energies must be run before another set, etc.

Identify the goals of the development run and indicate the experiment(s) for which the proposed run is relevant:

No need for apparatus or beam development, engineering run was already done

NOTE: INDICATE ALL MAJOR EQUIPMENT CHANGES, BREAKS, INSTALLATION OR SETUP, OR MAINTENANCE DAYS, ETC. ON SEPARATE LINES.

Days	Setup Number** from Radiation Budget Form	Special Requirements Include any variance from standard beam conditions, special developmental setups, special beamline or experimental equipment, and associated setup and installation times in the hall, etc

**Assume 100% efficiency for accelerator and experimental operations. ** Provide setup numbers as indicated on the Radiation Budget Form*

Appendix C

Pre-Installation Requirements

For all changes, additions, and enhancements to the standard* equipment (including detector systems) and for new equipment, identify for each area listed below the following specific items: who will be doing the work (User/J Lab staff/contractor); the manweeks required for the work; when the work will be done; and the work location.

Engineering and Design:**

Design support for 2H02 girder (3 meter upstream of the HPS target)
Design continuous vacuum beam line (pipes and connections) through CLAS12 torus and solenoid

Equipment to be Fabricated:***

Fabricate support for 2H02 girder
Fabricate beam pipes and supports

Pre-Installation Tests: (Identify any developmental activities with or without beam, associated with the equipment changes. Indicate locations.)

No tests are needed due to changes

** See the Hall leader for a list and description of standard equipment. ** Complete requirements must be provided for equipment requiring JLab engineering and design. *** Complete drawings must be provided for equipment to be fabricated by JLab*

INSTALLATION REQUIREMENTS

For each item below, identify days to complete installation, type of manpower (i.e. welder, electrician, programmer, etc.), manweeks of effort for each subsystem, and the man effort (User/J Lab staff/contractor).

	Equipment to be installed	Time (days) (Assuming 100% efficient operation)	Type of Manpower	Man-Weeks of Effort	User/JLab Staff/Contractor
Alignment	HPS magnet, HPS ECal, HPS SVT, beamline	5	Survey group	2	
Electrical					

Mechanical	Move HPS magnet on beam, connect and pump vacuum	2	Users/Hall-B engineering	2	1/1
Detector	Remove and install SVT for Layer 0. Install and test ECal and SVT chillers	10	Users/Hall-B engineering	6	4/2
Target					
Beamline (including Radcon)	Install 2H00 and 2H02 girders, 2H02A harp, connect and pump down beamline	5	Hall-B engineering	4	
Modifications to Standard Equip	Install additional layer of SVT	5	Users	4	4
Slow Controls (EPICS)	Test the system	2	Users	0.25	0.25
Other					

DECOMMISSIONING and DEINSTALLATION

List all items requiring decommissioning and/or deinstallation following your experiment. For each item indicate type of manpower (lift operator, welder, electrician, etc.), man-weeks of effort for each subsystem, and the man effort (User/J Lab staff/contractor).

Equipment to be removed	Equipment Location	Time (days) (Assuming 100% efficient operation)	Type of Manpower	Man-Weeks of Effort	User/J Staff/C
Move HPS magnet/SVT/ECal off beamline	Downstream alcove	2	Hall-B engineering/users	2	1

2H02 girder and beam pipes	Hall-B	2	Hall-B engineering	1	

Obtain hall leader's concurrence that the information in this Appendix is understood and adequate for schedule planning

Appendix D

Target Systems

For polarized targets, describe plans for irradiation activities. (Include in the proposed commissioning and run schedule all appropriate irradiation activities.)

Describe any changes and/or modifications to standard cryogenic targets.

Add installation and setup plans developed in coordination with C. Keith using the Appendix B format.

HPS uses tungsten and carbon foils as targets, they are installed, no need for new targets.

Appendix E

Data Acquisition

Indicate the anticipated data acquisition rates (peak and averages) as well as the anticipated total data going to media.

Data Acquisition Rate Peak (megabytes/second):

200

Rate Average (megabytes/second):

100

Total Data Going to Media (gigabytes):

500000

Indicate the proposed modifications to the data acquisition system. Include a schedule of developmental activities identifying who is doing the work.

DAQ system will be the same as in the engineering run

Indicate the proposed modifications to the controls system. Include a schedule of developmental activities identifying who is doing the work.

The control system will be the same as in the engineering run

Appendix F

User Staffing Profile

For each phase of the experiment (design, construction, testing, commissioning, running, deinstallation, and data reduction and analysis), indicate the number of onsite FTE users you anticipate, the incremental office and laboratory space required (i.e., space not already provided to collaboration members), and your desired location.

	Collaboration FTEs at JLab	Storage Space	Laboratory Space	How long is space needed?	Comments
Design					
Construction	4	10'x10'	12' x 12' clean room	2 weeks	For SVT Layer 0 installation
Testing	4		user office with 4 desks	2 weeks	Initial checkout, connecting all the systems and turning on. Testing software
Commissioning	4	10'x10'	user office with 4 desks, Hall-B counting room	2 weeks	Cosmic tests, pedestal runs

Running	8	10'x10'	user office with 4 desks, Hall-B counting room	3 months	
Deinstallation	2	10'x10'	user office with 4 desks	2 weeks	
Decommission					
Data					

If you require new office space, you need to contact the User Liaison Office at 757.269.6388 or users@jlab.org for additional information

Attachments
OnePageSummary.pdf
rad_budget.pdf

Signatures

Experiment Contact Person/Spokesperson Signed By: Stepan Stepanyan on 07/26/2016 08:42:33 AM

Keith, Christopher Signed By: Christopher Keith on 07/26/2016 08:49:15 AM

Heyes, Graham Signed By: Graham Heyes on 07/26/2016 09:09:06 AM

Beam Request Hall B Signed By: Volker Burkert on 07/26/2016 01:04:50 PM