

Hall-B Business Meeting

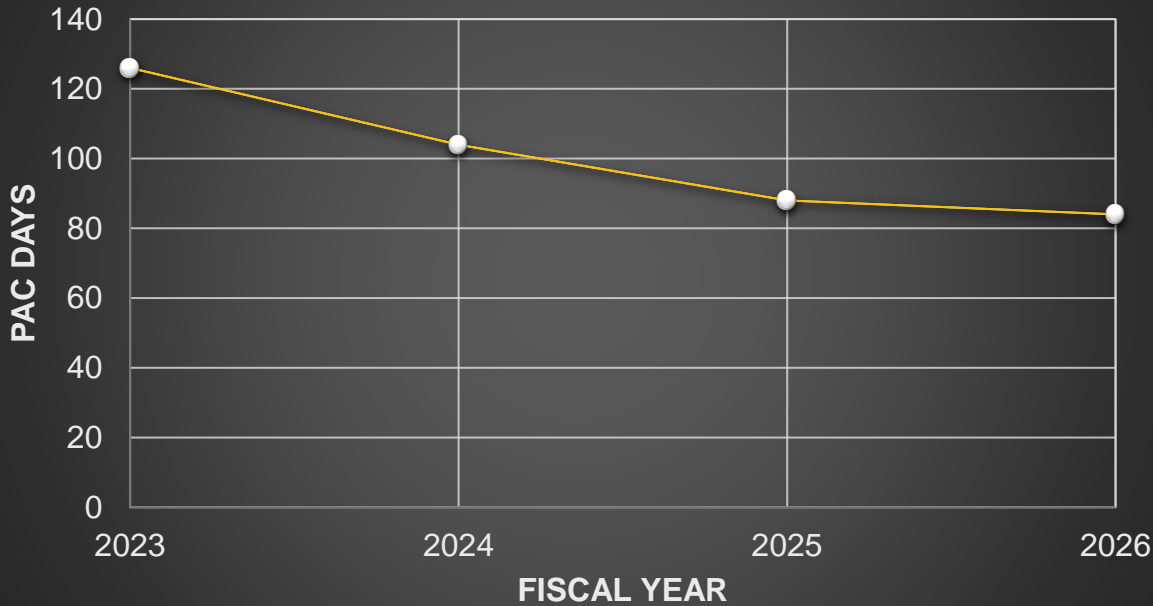


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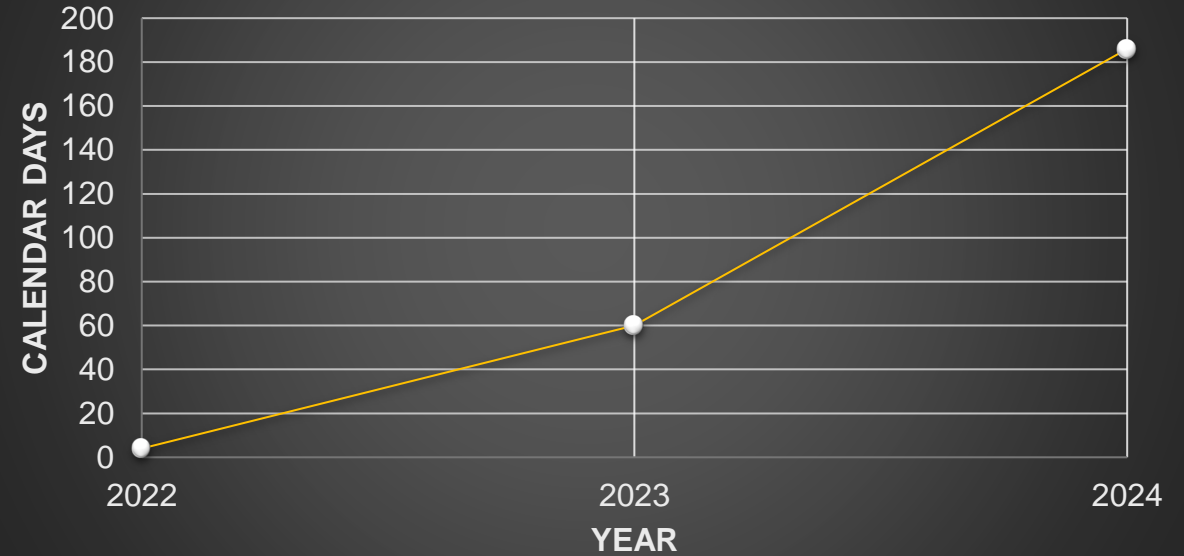
Comments on Hall B Run Scheduling

Hall B Scheduled Annual PAC Days



- **Downward trend** From FY23 to FY26: 122 – 104 – 88 – 84 PAC days
- Both, FY25 and FY26 scheduled operations based on anticipated **funding profile** and may be adjusted once budgets have been finalized

Delays after Scheduled Accelerator Maintenance



- **2023 SAD longer than expected** due to laboratory decision to implement a safety pause
- **2024 SAD longer than expected** for several reasons including laboratory decision to address hazardous energy control, unresolved safety issues, ePAS implementation, some closure days, and cryomodule plasma processing issues

Summary of Hall B Approved Experiments

HALL B Summary (calendar weeks = PAC days / 7 x 50% operational efficiency)	Approved PAC Days	Calendar Weeks	Remaining PAC Days	Calendar Weeks
PAC days for 53 approved and conditionally approved CLAS12 experiments and parts	1011	289	635	181
PAC days for 5 approved non-CLAS12 experiments	362	103	269	77
PAC days without positron beam experiments	1373	392	904	258
SUM of PAC days for positron beam experiments	210	60	210	60

- Listing at <https://www.jlab.org/Hall-B/clas12-web/HallB-RunGroupsExperiments-Mar2025.pdf>
- Between 90 and 120 PAC days in a run period between consecutive SAM periods
- Approved experiments (excluding positron beam) correspond to about **9 years of operation**

Considerations in Hall-B Scheduling



Considerations in Hall-B Scheduling

Operational aspects:

- Compatibility with accelerator operations and other Hall schedules (beam energies and polarizations)
- Experimental readiness of subsystems (software, hardware, personnel, ...)
 - Past: RG-E target; Present: ALERT; Future: HyCal setup; HPS setup; complex target systems
- Using the SAM period for major installations
 - Past: long. polarized target, new cryotarget; Present: ALERT; Future: HyCal setup, complex target systems
- Grouping of experiments and run groups efficiently to 25–30-week run periods
 - Past: RG-C; RG-D + RG-E + RG-K; Present: ALERT; Future: RG-C + RG-G, RG-E + HPS, RG-H
- Availability for opportunistic runs
- Reduction of the number of runs parts to minimize operational overhead
 - Future: Remaining time for RG-A, RG-B, RG-K, and HPS in just one run per beam energy?
- Effective use of CLAS12 upgrades such as luminosity upgrade or mitigation of CLAS12 detector aging
 - Future: Applicable to RG-A, RG-B?

Considerations in Hall-B Scheduling

Resource aspects:

- Effective use of Hall-B / Jefferson Lab funding aligned with a useful funding profile
 - FY 2025-28 funding for development of transverse polarized and polarized He-3 targets
 - Funding competition with SOLID after FY26?
- Coordination with Target Group and other groups at Jefferson Lab
 - Complex targets cannot run back-to-back
 - Runs with cryotarget (RG-A, RG-B, RG-K), RG-E target, or HPS between runs with complex target
- Synergies with other experiments or (DOE, LDRD, ...) projects
 - Recent example: Spin-polarized Fusion Project
- Effective use of grants and programmatic funding; availability of other resources
 - Coordination with CLAS (and other Hall B) Collaborations necessary
 - Funding competition with EIC possible

Considerations in Hall-B Scheduling

Scientific aspects:

- Use of PAC ratings
 - Most experiments are either rated A/A⁻ or are grouped with such experiments
- Competition with other experiments
 - Most experiments have no competitors because of the uniqueness of Jefferson Lab / CLAS12
 - PAC Jeopardy is addressing this aspect
 - X17 Search, HPS, and other dark photon experiments are more under pressure
- Providing **partial data sets** that can be used to develop analyses and to optimize follow-up runs
 - In the past, 50% data sets seemed to be useful
 - Partition into multiple data sets is creating more calibration issues
 - Partition into multiple data sets from different beam energies is complicating combined analyses
- Providing **partial data sets** for completion of PhD theses, first-of-a-kind publications, or grant applications
 - Time-like Compton Scattering from RG-A, neutron-DVCS from RG-B, and more successful examples
 - Coordination with CLAS (and other Hall B) Collaborations necessary

Considerations in Hall-B Scheduling

Strategic aspects:

- Priority to run 12-GeV beam when available?
 - For sure this was a consideration after 12-GeV Upgrade Project completion
 - Hall C is running a suite of low-energy hypernuclear experiments in the mid-term future
 - I am not aware of this aspect to have some relevance anymore
- Capitalize on past investments early?
 - This aspect might be relevant for using the long. polarized target again
- CLAS (and other Hall B) Collaboration strategic considerations
 - I am not aware of any such aspects

Considerations in Hall-B Scheduling

Operational aspects:

- Compatibility with accelerator operations and other Hall schedules
- Experimental readiness of subsystems (software, hardware, personnel, ...)
- Using the SAM period for major installations
- Availability for opportunistic runs
- Reduction of the number of runs parts to reduce operational overhead
- Grouping of experiments and run groups efficiently to 25–30-week run periods
- Effective use of CLAS12 luminosity upgrade

Resource aspects:

- Effective use of Hall-B / Jefferson Lab funding aligned with a useful funding profile
- Coordination with Target Group and other groups at Jefferson Lab
- Synergies with other experiments or (DOE, LDRD, ...) projects
- Effective use of grants and programmatic funding; availability of other resources

Scientific aspects:

- Use of PAC ratings
- Competition with other experiments
- Providing partial data sets that can be used to develop analyses and to optimize follow-up runs
- Providing partial data sets for completion of PhD theses, first-of-a-kind publications, or grant applications

Strategic aspects:

- Priority to run 12-GeV beam when available?
- Capitalize on past investments early?
- Collaboration strategic considerations

Run Schedule



Near-Term Run Schedule

Particularities:

- **Experiment Readiness Review for PRad-II/X17 on 9 May, 2025**
- In FY26, Hall C plans a program that requires reducing energy gain to around **700 MeV/pass** to get to special kinematics, currently scheduled for about 40 PAC days

(A) If the PRad-II and X17 Search experiments pass the ERR:

- The low beam energies fit well with experimental requirements
- The low beam energies will not be available during the years of MOLLER running
- Consequently, these experiments will run in FY26

(B) If the PRad-II and X17 Search experiments will not pass the ERR:

- About 50 PAC days for standard beam energies would be available
- The cryotarget could be installed in Hall B during SAM 2025 for RG-A or B or E or K
- About 40 PAC days for low beam energies would be available
- There are 10 PAC days left for RG-M to run with 1.1 GeV beam energy
- The only other approved Hall B experiment for low beam energies is HPS

Near-Term Conditional Run Schedule

SAD or scheduled Run Group	Setup / Status	Target	Beam Energy	Start Date	End Date	Scheduled Calendar Days	Remaining PAC Days Before Run	Scheduled PAC Days = Cal.Days/2	Actual PAC Days from ABUs	Remaining PAC Days After Run
PRad-II/X17	HyCal/GEMs	Radiator	2.2	2026-01-23	2026-02-02	10	60	5		55
X17 search	HyCal/GEMs	Ta foil	2.2	2026-02-02	2026-04-24	81	55	41		15
	reconfigure	change		2026-04-24	2026-05-01	7				
PRad-II	HyCal/GEMs	H2 gas	2.1	2026-05-01	2026-05-30	29	40	15		26
	pass change			2026-05-30	2026-05-31	1				
PRad-II	HyCal/GEMs	H2 gas	0.7	2026-05-31	2026-06-13	13	26	7		19
	pass change			2026-06-13	2026-06-14	1				
PRad-II	HyCal/GEMs	H2 gas	3.5	2026-06-14	2026-07-20	36	19	18		1
SAM 2026					sum:	178		sum:	85	

Originally Planned Mid-Term Run Schedule

Particularities:

- **Spin-Polarized Fusion Project** funded by DOE to develop an irradiation facility including beamline, cryostat, and more at Jefferson Lab and to procure and prepare polarized samples
 - A team is currently working on this project and making progress
 - This supports preparation for RG-C and E12-14-001 (RG-G) experiments

SAD or scheduled Run Group	Setup / Status	Target	Beam Energy	Start Date	End Date	Scheduled Calendar Days	Remaining PAC Days Before Run	Scheduled PAC Days = Cal.Days/2	Actual PAC Days from ABUs	Remaining PAC Days After Run
RG-C		long. polarized NH3/ND3	11			80	40	40		0
E12-14-001		long. polarized 7LiD	11			110	55	55		0
								sum:	95	

- Irradiated LiD samples will not be available in SAM 2025; high polarizability of target material samples needs to be demonstrated; realistically, ERR cannot happen in FY26
- Most probably, it will technically not be possible to run these experiments in FY27

Mid-Term Possible Run Schedules

- Discussed possible run schedules:

SAD or scheduled Run Group	Setup / Status	Target	Beam Energy	Start Date	End Date	Scheduled Calendar Days	Remaining PAC Days Before Run	Scheduled PAC Days = Cal.Days/2	Actual PAC Days from ABUs	Remaining PAC Days After Run
RG-E		liq. D2 & nucl. doublet	11			66	33	33		0
	reconfigure	change				7		4		
RG-K		liq. H2	8.8			120	52	60		0
sum:								97		

SAD or scheduled Run Group	Setup / Status	Target	Beam Energy	Start Date	End Date	Scheduled Calendar Days	Remaining PAC Days Before Run	Scheduled PAC Days = Cal.Days/2	Actual PAC Days from ABUs	Remaining PAC Days After Run
RG-E		liq. D2 & nucl. doublet	11			66	33	33		0
	reconfigure	change				7		4		
HPS	HPS setup	nuclear	4.4			120	105	60		45
sum:								97		

- Combinations with RG-A and RG-B are also possible

Discussion

- **I might have missed important scheduling aspects**
- **Collaboration input on “Considerations in Hall B Scheduling” is highly appreciated**

- **Near-term schedule will be announced after May 9, 2025**
- **Mid-term schedule should be announced in July 2025 CLAS Collaboration Meeting**
- **We could have such a “Hall B Business Meeting” every Collaboration Meeting**

APPENDIX



CLAS12 Run Group A and B Experiments

Experiments ending with A, B or C are run group additions running parallel to the experiments with same experiment number
 Experiments ending with (a) and (b) take data in two run groups

Proposal	Physics	Exp. Contact	Rating	Days	PAC	Jeop.	Group Days	Equipment	Energy	Group Contact	Target	Complete
E12-06-119(a)	Deeply virtual Compton scattering	M. Defurne	A	80	30	48, 52	139	CLAS12; RICH; Forward Tagger	11	A L. Elouadrhiri Deep Exclusive Processes	Liquid H ₂	74d 53%
E12-06-108	Hard exclusive electro-production of π^0, η	Stoler	B	80	38	48, 52						
E12-12-007	Exclusive ϕ meson electroproduction	Stoler, Weiss	B+	60	39	48, 52						
E12-06-112	Proton's quark dynamics in SIDIS pion production	H. Avakian	A	60	38	48, 52						
E12-06-112A/ E12-09-008A	Semi-inclusive Λ production in target fragmentation region	M. Mirazita			42	48, 52						
E12-06-112B	Collinear nucleon structure at twist-3 in dihadron SIDIS	M. Mirazita			42	48, 52						
E12-12-001	Timelike Compton scattering and J/ψ photoproduction	P. Nadel-Turonski	A-	120	39	48, 52						
E12-12-001A	Near threshold J/ψ photoproduction and LHCb pentaquarks	S. Stepanyan			45	48, 52						
E12-09-003	Excitation of nucleon resonances at high Q^2	R. Gothe	B+	40	34	48, 52						
E12-06-108A	Exclusive N^* to KY studies with CLAS12	D. Carman			42	48, 52						
E12-06-108B	Transition form factor of the η' meson with CLAS12	S. Schadmand			44	48, 52						
E12-11-005	Hadron spectroscopy with forward tagger	M. Battaglieri	A-	119	37	48, 52						
E12-11-005A	Photoproduction of the very strangest baryon	L. Guo			40	48, 52						
E12-07-104	Neutron magnetic form factor	G. Gilfoyle	A-	30	32	48, 52	90	CLAS12; BAND; RICH; Forward Tagger	11	B S. Niccolai	Liquid D ₂	39d 43%
E12-07-104A	Quasi-real photoproduction on deuterium	F. Hauenstein			47	48, 52						
E12-09-007(a)	Study of partonic distributions in kaon SIDIS	W. Armstrong	A-	110	38	48, 52						
E12-09-008	Boer-Mulders asymmetry in kaon SIDIS with H and D targets	M. Contalbrigo	A-	56	38	48, 52						
E12-09-008B	Collinear nucleon structure at twist-3 in dihadron SIDIS	M. Mirazita			42	48, 52						
E12-11-003	DVCS on the neutron	S. Niccolai	A (HI)	90	38	48, 52						
E12-11-003A	In medium structure functions, SRC, and the EMC effect	O. Hen			43	48, 52						
E12-11-003B	Study of J/ψ photoproduction from the deuteron	Y. Ilieva			46	48, 52						
Total PAC days for 21 PAC approved experiments or experimental parts, all partially completed in 2018-2020							229					113

CLAS12 Run Groups C, F, K, and M Experiments

Experiments ending with A, B or C are run group additions running parallel to the experiments with same experiment number
 Experiments ending with (a) and (b) take data in two run groups

Proposal	Physics	Exp. Contact	Rating	Days	PAC	Jeop.	Group Days	Equipment	Energy	Group Contact	Target	Complete
E12-06-109	Longitudinal spin structure of the nucleon	S. Kuhn	A	80	30	48, 52	120	CLAS12; RICH; Forward Tagger	11	C S. Kuhn	Long. polarized NH ₃ ND ₃	81d 67%
E12-06-109A	DVCS on the neutron with polarized deuterium target	S. Niccolai			44	48, 52						
E12-06-119(b)	DVCS on longitudinally polarized proton target	M. Defurne	A	120	38	48, 52						
E12-07-107	Spin-orbit correlations with longitudinally polarized target	H. Avakian	A-	103	38	48, 52						
E12-07-107A	Single baryon production in the target fragmentation region	T. Hayward			50	52						
E12-09-007(b)	Study of partonic distributions using SIDIS K production	W. Armstrong	A-	80	38	48, 52						
E12-09-007A	Dihadron electroproduction in DIS	C. Dilks			48	52						
E12-09-009	Spin-orbit correlations in K production with polarized targets	H. Avakian	B+	103	38	48, 52						
E12-06-113	Free neutron structure at large x	S. Buelتمان	A	42	30		42	CLAS12; Radial TPC	11	F	Gaseous D ₂	42d 100%
E12-06-113A	Neutron DVCS measurements with BONuS12	R. Dupré			47							
E12-16-010	A search for hybrid baryons	A. D'Angelo	A-	100	44	48	100	CLAS12; Forward Tagger	6.6, 8.8	K A. D'Angelo	Liquid H ₂	49d 49%
E12-16-010A	Nucleon Resonances in exclusive KY electroproduction	D. Carman			44	48						
E12-16-010B	DVCS at 6.6 and 8.8 GeV	L. Elouadrhiri			44	48						
E12-16-010C	Separation of the σ_L and σ_T contributions to hadron production	H. Avakian			51							
E12-17-006	Electrons for neutrinos addressing neutrino-nucleus issues	O. Hen	A	45	46		45	CLAS12; No Forward Tagger	1.1, 2.2, 4.4, 6.6	M O. Hen	Nuclear	35d 78%
E12-18-003	Exclusive studies of short-range correlations in nuclei	O. Hen			46							
Total PAC days for 16 PAC approved experiments or experimental parts, 14 partially and 2 fully completed in 2018-2024							307					207

CLAS12 Run Group D, E, and L Experiments

Experiments ending with A, B or C are run group additions running parallel to the experiments with same experiment number

Proposal	Physics	Exp. Contact	Rating	Days	PAC	Jeop.	Group Days	Equipment	Energy	Group Contact	Target	Complete
E12-06-106	Color transparency in exclusive vector meson production	L. El Fassi	B+	30	30	48	30	CLAS12	11	D L. El Fassi	Nuclear & liquid D ₂	40d 100%
E12-06-106A	Nuclear TMDs	R. Dupre			48							
E12-06-117	Quark propagation and hadron formation	W. Brooks	A-	60	30	48	60	CLAS12	11	E H. Hakobyan	Nuclear & liquid D ₂	27d 45%
E12-06-117A	Dihadron measurements in electron-nucleus scattering	M. Arratia			48							
E12-17-012	Partonic structure of light nuclei	Z. Meziani	A-	55	45		55	CLAS12; Forward Tagger; ALERT	11	L R. Dupré	High pressure gaseous H, D, ⁴ He	Scheduled for 2025
E12-17-012A	Tagged EMC measurements on light nuclei	R. Dupré			45							
E12-17-012B	Spectator-tagged DVCS on light nuclei	W. Armstrong			45							
E12-17-012C	Other physics opportunities with ALERT	R. Dupré			45							
E12-23-013	Measuring short-range correlations with ALERT	F. Hauenstein	A	17	51		17		6.6	F. Hauenstein (RG-T)		
Total PAC days for 9 PAC approved experiments, 2 fully and 2 partially completed, 5 scheduled to get completed in 2025							162					57

CLAS12 Run Group H and other not-scheduled CLAS12 Experiments

Proposal	Physics	Contact	Rating	Days	PAC	Jeop.	Group Days	Equipment	Energy	Group	Target	Complete
E12-14-001	EMC effect in spin structure functions	W. Brooks	B+ » A-	55	35	48, 52	55	CLAS12	11	(RG-G)	Pol. ^7LiD	
C12-11-111	SIDIS on transverse polarized target	M. Contalbrigo	A » C1	110	39	48, 52	110	CLAS12	11	H M. Contalbrigo	Trans. pol. NH_3	
C12-12-009	Transversity with di-hadron on transverse target	H. Avakian	A » C1	110	39	48, 52						
C12-12-010	DVCS with transverse polarized target	L. Elouadrhiri	A » C1	110	39	48, 52						
C12-20-002	Spin-dependent electron scattering with polarized ^3He target	R. Milner	A-	30	48		30	CLAS12	11	(RG-N)	Pol. ^3He	
E12-20-005	Precision measurements of A=3 nuclei	H. Szumila-Vance	A-	60	48		60	CLAS12	2.2, 6.6	(RG-P)	$^3\text{H}/^3\text{He}$	
C12-21-004	SIDIS measurement of A=3 Nuclei	L. Weinstein	C2	58	49, 50		58	CLAS12	11		$\text{D}/^3\text{H}/^3\text{He}$	
Total PAC days for 7 PAC approved and conditionally approved experiments							313					

Non-CLAS12 Experiments in Hall B

Proposal	Physics	Exp. Contact	Rating	Days	PAC	Jeop.		Equipment	Energy	Group	Target	Complete
E12-11-006	Heavy Photon Search (HPS)	T. Nelson	A	180	37, 39	48, 52		HPS setup in alcove	2.2, 6.6	(RG-I)	Nuclear	78d 43.3%
E12-11-106	High precision measurement of proton charge radius (PRad)	A. Gasparian	A	15	39			HyCal setup	1.1, 2.2	(RG-J)	H2 gas jet	15d 100%
E12-20-004	High precision measurement of proton charge radius (PRad-II)	A. Gasparian	A	40	48			HyCal setup	0.7, 1.4, 3.5	(RG-O)	H2 gas jet	
E12-21-003	A direct detection search for hidden sector new particles (X17)	A. Gasparian	A	60	50			HyCal setup	2.2	(RG-Q)	Ta foil	
E12-22-003	Precision measurement of neutral pion transition form factor	I. Larin	A-	67	50			HyCal setup	11	(RG-S)	Si foil	
Total PAC days for 5 PAC approved experiments, 1 partially, 1 fully completed in 2016-2021				362								93

Conditionally approved Positron Beam Experiments in Hall B

Proposal	Physics	Contact	Rating	Days	PAC	Jeop.		Equipment	Energy	Group	Target	Complete
C12+23-008	A direct measurement of hard two-photon exchange with e^{+/-}	A. Schmidt	A	55	51			CLAS12	2.2, 4.4, 6.6		Liquid H ₂	
C12+23-002	Beam charge asymmetries for DVCS on the proton	E. Voutier	A-	100	51			CLAS12	2.2, 11		Liquid H ₂	
C12+24-005	A Dark Photon Search with a JLab positron beam	B. Wojtsekhowski	A-	55	52			CLAS12	2.2,4.4,11		Liquid H ₂	
Total PAC days for 3 PAC conditionally approved positron beam experiments				210								