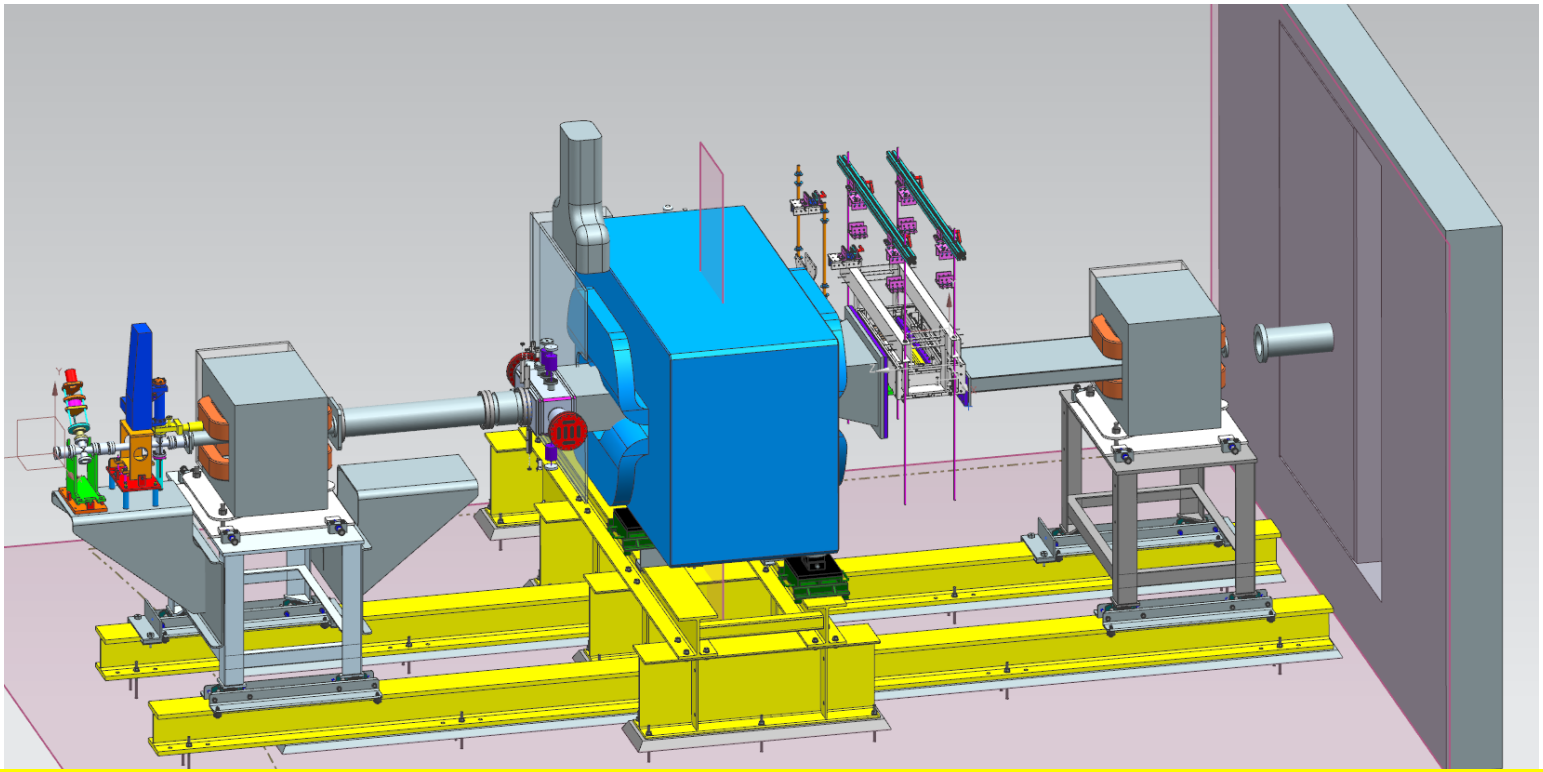
HPS status report
12/17/2013

Stepan Stepanyan
JLAB

HPS chicane design status

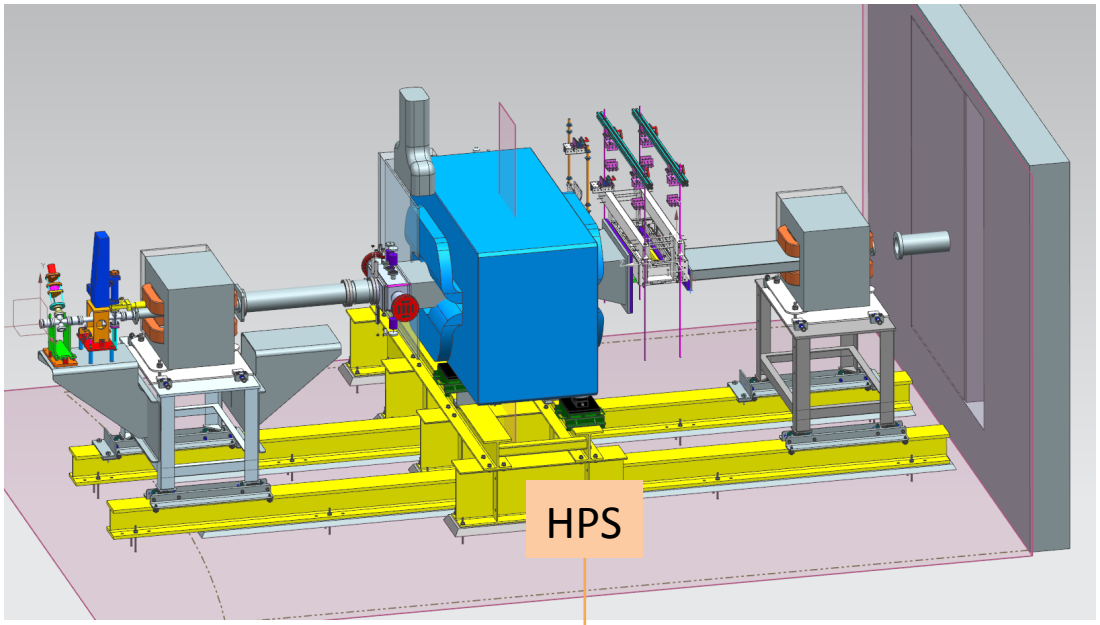
- Design of the alcove setup for chicane magnet supports has been complete
- Currently drawings are reviewed for purchasing components



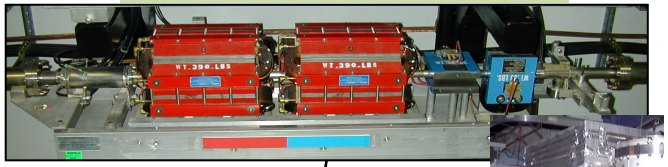
Critical milestone: magnets must be installed in alcove before June 2014 not to interfere with CLAS12 torus assembly

HPS beamline

- Most of Hall-B beam line will be unchanged
- Two new girders – one on the space frame, one on the forward carriage



BPM, 2-QA, and H-V-correctors



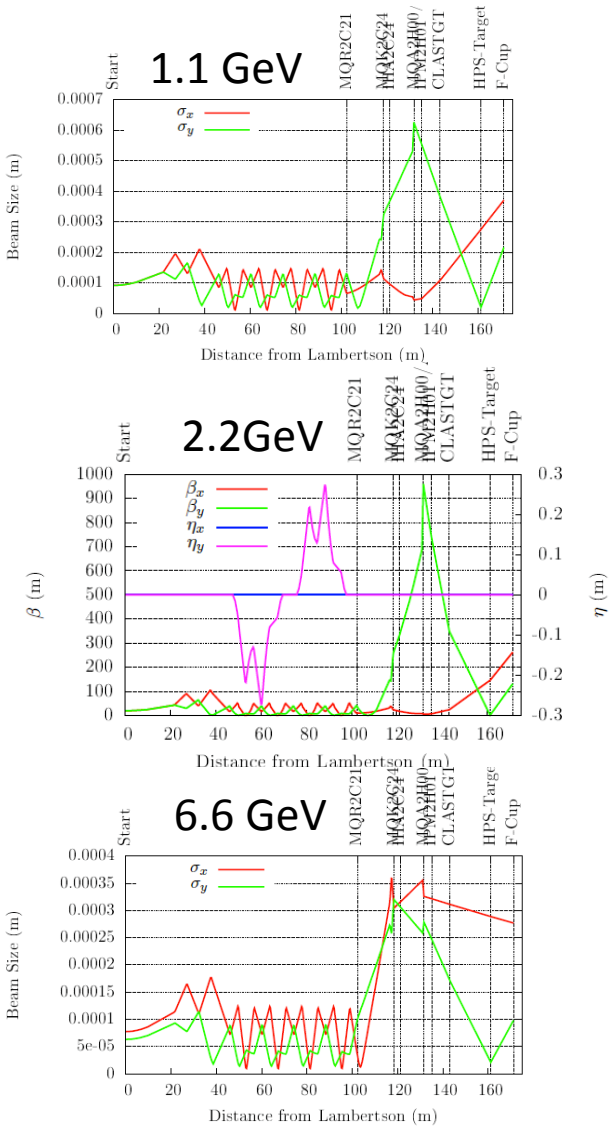
2H01 nA BPM

H-V-correctors and BPMs

Beamline design status

- Elements on B-deck are defined
- Design of new girders started
- A few elements can be barrowed some must be purchased (as was expected)

Element Name	Distance to Start (m)	Distance to Center of Hall (m)	Owner	Comment
MQR2C20	98.92856	-44.27891		
IPM2C21	101.76391	-41.44356		
MQR2C21	102.13825	-41.06922		
MQA2C21A	103.56545	-39.64202		
IHA2C21	104.37045	-38.83702	Hall-B:	
IPM2C21A	105.56825	-37.63922		
IPM2C22	116.34875	-26.85872		
MQK2C22	116.69875	-26.50872		
MQK2C23	117.44023	-25.76724		
MQK2C24	118.30841	-24.89906		
IPM2C24A	118.66841	-24.53906		
IHA2C24	121.15381	-22.05366	Hall-B:	
ATAGGER	125.5601	-17.64737		
COLA	127.9221	-15.28537		
IPM2H00	130.9221	-12.28537	Eng.	New
MQA2H00	131.29675	-11.91072	Eng.	Spare
MQA2H00A	131.59675	-11.61072	Eng.	Spare
MBD2H00H	131.93990	-11.26757	Eng.	Spare
MBD2H00V	132.13599	-11.07148	Eng.	Spare
ITV2H01	135.16210	-8.04537	Eng.	Existing nA stand
IPM2H01	135.16210	-8.04537	Eng.	recommission
CENTEROFHALL	143.20747	0		
IPM2H02	155.20747	12. ?	Eng:	New
MBD2H02H	155.20747	12. ?	Eng.	New, precise
MBD2H02V	155.20747	12. ?	Eng:	New, location TBD
IPM2H03	157.27529	14.06782	Eng:	New
IHA2H03	157.27529	14.06782	HPS:	Moved 2H00 Harp
ETA2H03	157.68647	14.47900	HPS:	Collimator
ETA2HHPS	160.23815	17.03068	HPS:	
IFY2D00	170.23815	27.03068	HPS:	



“off-project” milestones

Regular meetings are held with accelerator and Hall-B engineering groups to track “off-project” milestones

	Off-project milestones	Start date	Finish date	Responsibility	Comments
Beamline					
	Hall-B transport line		8/29/14	Accelerator	Quads and correctors are in place, not connected
	Hall-B upstream beamline ready		8/29/14	Accelerator/Hall-B	Work is started
	Commissioning of RF separator		11/3/14	Accelerator	
	1/2/3 pass separaton and beam delivery		11/10/14	Accelerator	
Hall-B work					
	CLAS12 PCAL and FTOF are mounted	10/1/13	2/28/14	Hall-B	PCALs and 15% of FTOF are installed
	Preparing alcove	10/1/13	3/7/14	Hall-B	Work is started
	Forward carriage move to upstream	3/3/14	3/7/14	Hall-B	Chicane Magnets can be installed after this is finished
CLAS12 Torus assembly					
	Start assembly of the Spit	6/8/14	6/19/14	Hall-B/Magnet	Magnets must be installed in alcove before this starts
	Install Torus Coils	7/21/14	1/7/15	Hall-B/Magnet	
	Cold-to-worm supports	3/16/15	3/28/15	Hall-B/Magnet	
	Weld VJ	2/28/15	4/11/15	Hall-B/Magnet	
	Orient and secure Torus to Hall B floor	4/11/15	4/28/15	Hall-B/Magnet	
	Connect leads and piping	4/28/15	5/19/15	Hall-B/Magnet	
	Leak test and Pump VJ	6/2/15	6/26/15	Hall-B/Magnet	

Progress on ECal

- Funding for HPS has been received from INFN and IPN-ORSAY, ~500K EURO. This funding will be used for:
  - purchase of new large area APDs (250K EURO) – POs from ORSAY and ONFN/ Genova have been submitted, first delivery in 2.5 months
  - rework amplifier boards - design is completed, some of components have been purchased
  - new mother boards – motherboards have been purchased
  - LED based LMS – design is progressing as planned
  - a new mounting system - design is in progress
- Both modules of ECal have been disassembled:
  - Enclosures with amplifiers are ready for shipment to ORSAY for rework
  - modules have been prepared for old APDs removal (will start in January)
- INFN and Orsay groups will design and build APD test setup and APD gluing fixtures, and will provide part of manpower for ECal assembly

Running HPS during Accelerator Periods III and IV

- During Acc. Period III and Period IV beam delivery to Hall-B will be possible after RF separators are commissioned, November 3rd, 2014
- During the same period Hall-B will continue assembly of the CLAS12 Torus magnet and possibly other detectors

"Running would occur during evenings and weekends or during other periods when it would not conflict with the regularly scheduled assembly of the CLAS12 Torus coils" (from the HPS implementation plan document) and Accelerator commissioning plans (12 GeV has priority)

- First meeting with physics division for scheduling HPS and preparing for the experiment readiness review took place on December 10
- Follow-up meeting will be on January 8 with JLAB management. Will discuss coordination between HPS and 12 GeV work.
- Experiment readiness review will take place in April, 2014.

Accelerator Period III and Period IV

Source: http://opsweb.acc.jlab.org/TJ3/12GeV_CEBAF/FY15.htm

WBS	Name	Start	End	Effort	Duration	ProjectAccount
1	**Milestones**	**Wed 2013-01-02**	**Sat 2017-09-30**	**0.0**	**247.4**	
1.4	**12GeV Project Level 2 Milestones**	**Fri 2013-12-20**	**Thu 2016-03-31**	**0.0**	**118.7**	
1.4.3	Hall-D Beam Commissioning Completed	Wed 2014-12-31	Wed 2014-12-31	0.0	0.0	
10	**12GeV CEBAF Commissioning**	**Thu 2014-02-06**	**Fri 2015-06-12**	**24.7**	**70.0**	
10.4	**Accelerator Period III: E Various 2-hall operation?**	**Mon 2014-09-22**	**Fri 2014-12-19**	**7.7**	**12.6**	
10.4.1	Machine Recovery and Push energy to 2.2GeV/pass	Mon 2014-09-22	Mon 2014-10-20	2.7	4.0	MD_NP
10.4.2	1/2/3 pass separation E>1.1GeV/pass	Mon 2014-10-20	Mon 2014-11-03	2.0	2.0	MD_NP
10.4.3	Beam through HallD line: E>1.1GeV/pass	Mon 2014-11-03	Mon 2014-11-10	1.0	1.0	Spreops_NP
10.4.4	HallD Detector Checkout: E>1.8GeV/pass?	Mon 2014-11-10	Fri 2014-12-05	0.0	3.6	Preops_12GeV
10.4.5	5.5 physics beam development: E>2GeV/pass	Fri 2014-12-05	Fri 2014-12-19	2.0	2.0	MD_NP
10.5	**Accelerator Period IV: E>2GeV/pass 2-hall operation**	**Fri 2015-02-13**	**Fri 2015-06-12**	**17.0**	**17.0**	
10.5.1	Restoration and Multiple beam characterization	Fri 2015-02-13	Fri 2015-04-03	7.0	7.0	MD_NP
10.5.2	Hall-D engineering run/A Engineering (parasitic) run	Fri 2015-04-03	Fri 2015-04-24	3.0	3.0	MD_NP
10.5.3	Hall-A Physics: First Physics	Fri 2015-04-24	Fri 2015-06-12	7.0	7.0	Research_NP
11	**Physics 12GeV Initial Ops**	**Fri 2015-09-11**	**Sat 2016-05-28**	**2.9**	**37.1**	
11.1	**Physics Period I: E>2GeV/pass**	**Fri 2015-09-11**	**Tue 2015-12-22**	**2.9**	**14.6**	
11.1.1	Machine restoration	Fri 2015-09-11	Fri 2015-09-18	1.0	1.0	MD_NP
11.1.2	4/5 pass separation	Fri 2015-09-18	Fri 2015-10-02	1.9	2.0	MD_NP

All effort and duration values are in weeks. 24/7 scenario

Container Task Normal Task Milestone
Off-duty period

Things to note:

- ❑ Up-to 3 pass separation will be available after Nov. 3, 2015
- ❑ Beam delivery to Hall-D is 1 week effort with 24-hour availability (total 168 hours)
- ❑ Machine setting will be changed on Dec. 5, 2015
- ❑ Availability of experts for beam tuning to Hall-B over night, after the two shifts of day time work

HPS / Accelerator / Torus Schedule

Task Mode	Task Name	Duration	Start	Finish	Prede
	HPS Available	321 days	Wed 10/1/14	Wed 12/23/15	
	Beam Available				
	Accelerator Period III	65 days	Mon 9/22/14	Fri 12/19/14	
	Accelerator Period IV	86 days	Fri 2/13/15	Fri 6/12/15	
	Physics Period I	73 days	Fri 9/11/15	Tue 12/22/15	
	Torus Assembly	321 days	Mon 6/30/14	Mon 9/21/15	
	Install Beam left and right cold ring beams	10 days	Thu 9/18/14	Wed 10/1/14	
	Install Coil E and C Assemblies (mechanical)	12 days	Mon 10/13/14	Tue 10/28/14	
	Install Coil A	14 days	Fri 12/19/14	Wed 1/7/15	
	Insulate all 4K Surfaces	10 days	Mon 2/9/15	Fri 2/20/15	
	Complete Central hub heat shield	4 days	Mon 2/23/15	Thu 2/26/15	
	Attach cold to warm support to VJ (2 places)	5 days	Mon 3/16/15	Fri 3/20/15	
	Connect all Heat Shield cooling tubes	3 days	Mon 4/6/15	Wed 4/8/15	
	Pump VJ, leak and pressure test	10 days	Thu 6/4/15	Wed 6/17/15	
	Cool Down	20 days	Tue 7/28/15	Mon 8/24/15	

Time available in Hall-B - "on the floor with beam"

Run plan – evenings and weekends

- CLAS12 Torus assembly involves Hall B access for 1 shift for 5 days per week. Hall should be in "Restricted access" at least 9-10 hours (Dave Kashy)
- Sweeping the Hall to get from "Beam permit" to "Restricted access" and visa versa is 1 hour per sweep if ARM is available (6-GeV experience). Hall-B not been a priority, it may take longer (ARM may not be available for multiple locations)

Realistic scenario for work week – 12 hours split between "Beam permit" and "Restricted access"

- From experience in Hall-B (Hall-B logbook 2009, experiments e1-DVCS, eg1-DVCS, and eg6) the average time for recovery after the accelerator maintenance is 6 hours (time between when shift personal asked to go to beam permit and when run started). This 6 hours have been with a fairly well understood machine, with moderate demands on the beam quality. In run periods under question we face with a new machine and with experiments that have very high demands for beam quality

Realistic scenario for work week – 8 hours/day "on the floor with beam" or
Total of 88 hours "on the floor with beam" per week
This is about 50% of what normally would have been available per week - "on the floor with beam" / "on the floor" = 0.5

Beam time needed for HPS

A minimum of **21 "beam on target" days -**
7 days of commissioning, and minimum 14 days of data taking at 1.1 GeV and 2.2 GeV

Nominal (from 6-GeV era) ratio for:
"beam on target" / "on the floor with beam" = 0.5

With availability of Hall-B during Accelerator periods III and IV this ratio is:

"beam on target" / "on the floor" = 0.25

For HPS "on the floor" time is 84 days

Reserving the time before December 5, 2014, for a general Hall-B beamline commissioning, the time available for the experiment is:
14 (Dec. 2014) + 119 (Feb. to June 2015) = 133 (with "restoration"* time – 10.5.1)
14 (Dec. 2014) + 70 (April to June 2015) = 84 (without "restoration"* time)

* 10.5.1 of Acc. period IV has "multiple beam characterization", not clear if that will be suitable for physics running