HPS 2021 Run Planning

Tim Nelson

HPS Collaboration Meeting

SLAC (?) – June 23, 2021

U.S. DEPARTMENT OF ENERGY
Office of Science

SLAC NATIONAL ACCELERATOR LABORATORY

2021 Operations Schedule

Key dates in official schedule

- 8/16 hall closes for first beam
- 8/23 beam available for physics
- 10/16 last day of run

Three periods of operation:

- 15 days @ 3.74 GeV
- 2 days @ 1.92 GeV (?)
- 38 days @ 3.74 GeV

Activities in other halls to consider:

- Hall C/D will run solidly on 5/5.5 pass
- Hall A will begin late (currently 13 days)

Once C&D are tuned, should be possible to get a lot of attention from MCC for first part of run.

Overall, this looks like a good time for long periods of stable operations.

14	08/21/21	Saturday	1.82	Restore	INSTALL			
15	08/22/21	Sunday	1.82	Restore	INSTALL			
16	08/23/21	Monday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
17	08/24/21	Tuesday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
18	08/25/21	Wednesday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
19	08/26/21	Thursday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
20	08/27/21	Friday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
21	08/28/21	Saturday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
22	08/29/21	Sunday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
23	08/30/21	Monday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
24	08/31/21	Tuesday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
25	09/01/21	Wednesday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
26	09/02/21	Thursday	1.82	Physics	INSTALL		Run Group I	3.7/200/-/500
27	09/03/21	Friday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
28	09/04/21	Saturday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
29	09/05/21	Sunday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
30	09/06/21	Monday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
31	09/07/21	Tuesday	1.82	Physics	PASS CHANGE		Run Group I	3.7/200/-/500
32	09/08/21	Wednesday	1.82	Physics	E12-09-019	3.74/40/-/500	Run Group I	3.7/200/-/500
33	09/09/21	Thursday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
34	09/10/21	Friday	1.82	Physics	PASS CHANGE		Run Group I	3.7/200/-/500
35	09/11/21	Saturday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
36	09/12/21	Sunday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
37	09/13/21	Monday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
38	09/14/21	Tuesday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
39	09/15/21	Wednesday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
40	09/16/21	Thursday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
41	09/17/21	Friday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
42	09/18/21	Saturday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
43	09/19/21	Sunday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
44	09/20/21	Monday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
45	09/21/21	Tuesday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
46	09/22/21	Wednesday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
47	09/23/21	Thursday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
48	09/24/21	Friday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
49	09/25/21	Saturday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
50	09/26/21	Sunday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
51	09/27/21	Monday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
52	09/28/21	Tuesday	1.82	Physics	E12-17-004	5.56/40/p/500	Run Group I	3.7/200/-/500
53	09/29/21	Wednesday	1.82	Physics	E12-17-004	5.56/40/p/500	Run Group I	3.7/200/-/500
54	09/30/21	Thursday	1.82	Physics	E12-17-004	5.56/40/p/500	Run Group I	3.7/200/-/500
55	10/01/21	Friday	1.82	Physics	E12-17-004	5.56/40/p/500	Run Group I	3.7/200/-/500
56	10/02/21	Saturday	1.82	Physics	E12-17-004	5.56/40/p/500	Run Group I	3.7/200/-/500
57	10/03/21	Sunday	1.82	Physics	E12-17-004	5.56/40/p/500	Run Group I	3.7/200/-/500
58	10/04/21	Monday	1.82	Physics	E12-17-004	5.56/40/p/500	Run Group I	3.7/200/-/500
59	10/05/21	Tuesday	1.82	Physics	E12-20-008	5.56/40/-/500	Run Group I	3.7/200/-/500
60	10/06/21	Wednesday	1.82	Physics	E12-20-008	5.56/40/-/500	Run Group I	3.7/200/-/500
61	10/07/21	Thursday	1.82	Physics	E12-20-008	5.56/40/-/500	Run Group I	3.7/200/-/500
62	10/08/21	Friday	1.82	Physics	E12-20-008	5.56/40/-/500	Run Group I	3.7/200/-/500
63	10/09/21	Saturday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
64	10/10/21	Sunday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
65	10/11/21	Monday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
66	10/12/21	Tuesday	1.82	Physics	E12-09-019	Reconfigure	Run Group I	3.7/200/-/500
67	10/13/21	Wednesday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
68	10/14/21	Thursday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
69	10/15/21	Friday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
70	10/16/21	Saturday	1.82	Physics	E12-09-019	5.56/40/-/500	Run Group I	3.7/200/-/500
71	10/17/21	Sunday		Reconfigure			Install Run Group M	
72	10/18/21	Monday		Reconfigure			Install Run Group M	
73	10/19/21	Tuesday		Reconfigure			Install Run Group M	

Establishing Physics Quality Beam

Need to update procedures to incorporate new diagnostics: should improve safety, reliability, efficiency, but will take time to refine

Establishing beam to the tagger dump:

- as previously, SVT will be powered off
- monitor rates at new neutron counters
- measure trajectory with 2C24 wire scan and BPM (can take time to get wire scan)

Establishing beam to the Faraday cup:

- minimum current for stable BPM operation: 50 nA
- use 8 mm collimator, aligned to beamline (and therefore SVT)
- don't allow MCC ops to "hunt" for the aperture in the collimator: upstream FSD stays on.

Establishing beam for physics

- mark spot on viewer, take 2H00/2H02 harp scans, record BPM positions for initial tune
- collimator scan to set initial beam position in y and repeat above scans
- take SVT scans to refine (x,y) position to define final trajectory and focus parameters in Hall
- cross-check with rates in crystals around ECal hole with thinnest target (4 um)
- calibrate BPM settings with higher currents (100 nA? 200 nA?)
- Set orbit locks and FSD threshold and perform test of FSD system

Beam studies: can be done while DAQ is being commissioned and exercised

- Struck scaler studies?
- Beam tails with slow wire scans

Establishing Production Running

50 nA beam on thinnest target (8 um), 2.82 mm collimator, SVT at 1.5 mm

- ECal rates and monitoring plots
- Calibrate and time in SVT and study monitoring plots
- DAQ and trigger studies / trigger validation runs
- Move SVT in to 0.5 mm with no target, watching carefully currents and occupancies
- empty target run for precise measurement of beam tails
- study tracking and vertexing at 0.5mm, begin taking physics data

Ramp current towards 300 nA?

- fine tune beam trajectory and establish parameters for tuning beam to FC
- study SVT behavior and performance
- study trigger rates
- study DAQ performance and address any issues

If surface currents are problem, move to thicker (15 um, 20 um) targets to achieve desired luminosity.

Normal Operations and Planning for Special Runs

Need to establish operational procedures and update manuals as things develop

- response to beam trips and HV trips in SVT (should include careful examination of SVT monitoring before/after).
- down periods for surface currents in first layer (may be different with new sensors)
- frequent and consistently periodic calibration of the SVT (should be daily)

Need to have plans ready for special runs:

- Møllers at 1.92 GeV: do we need it? Will Hall A take two-pass beam?
- FEE runs: how much is needed? Do we want some early on?
- Runs with random triggers? How much/often?
- Straight throughs should be considered very carefully due to potential for SVT damage. If performed, should be after we have taken all of our physics data.
- Bias scans at specified intervals: every 25% of planned integrated luminosity?
- Others?

Groups should be actively thinking about what they may want.