7. One 10-min run at 15 uA, **coin** , ps6 prescaled as needed to keep CODA Data rate below 100 MByte/sec.

5. Dummy Target
    1. 10 min run at 36 uA, coin_sparse, ps6=0
    2. 10 min run at 18 uA, coin_sparse, ps6=0
6. LH2 Target
    1. Two 1-h runs at 36 uA, coin_sparse, ps6=0,
    2. One 20-min run at 24 uA, coin_sparse, ps6=0,
    3. One 20-min run at 12 uA, coin_sparse, ps6=0,
    4. One 20-min run at 36 uA, coin_sparse, ps3=1 (or as required to keep event rate about 2KHz)
    5. One 40-min run at 24 uA, coin_sparse, ps4=0 (Event rate </= 3 KHz OK, but prescale if needed to keep data rate </= 100 MBy/sec)
    6. One 20-min run at 12 uA, coin_sparse_low, ps6 prescaled as needed to keep CODA Data rate below 100 MByte/sec.
    7. One 10-min run at 36 uA, coin, ps6 prescaled as needed to keep CODA Data rate less than 100 MByte/sec.
7. Repeat the cycle above until a change of kinematic.

2. Monday Nov 6, day Moller run
3. Monday Nov 6 evening, continue KinC_x50_4' cycle until reaching 60% of charge goals

---

The instructions below are for previous shifts and are kept here for the record.

- **Wednesday, November 1 (evening):**
    - Enter run #s on this sheet and add to binder at end of shift

1. Test for setting KinC_x60_4
    1. Move HMS to 19.31 deg
    2. Set HMS momentum to -5.052 GeV (electrons). This does not require going to MOL if HMS is initially at -5.253, just current setpoints.
    3. Move SHMS to 31.39 deg (NPS at 15.09)
    4. Target "out of Beam" request MCC turn on NPS Sweep Magnet to 468 Amp and tune Correctors following their procedure, starting from both correctors at 0.0 Amp.
    5. If MCC tunes to non-zero correctors, then do the following optics test:
        1. Sweep & Correctors ON, HMS Collimator **Sieve**
            1. 30 min run: Target Carbon 0.5% , 30 uA, ps4=0, all other ps=-1
            2. 30 min run: Target Optics +/- 8cm , 30 uA, ps4=0, all other ps=-1
        2. Sweep & Correctors OFF, HMS Collimator **Sieve**
            1. 30 min run: Target Carbon 0.5% , 30 uA, ps4=0, all other ps=-1
            2. 30 min run: Target Optics +/- 8cm , 30 uA, ps4=0, all other ps=-1
        3. Sweep ON (Correctors on if needed by MCC), Restore HMS **Large Collimator**
    6. Now two short production test runs. Label these in CODA and on paper KinC_x60_4
        1. One-hour run: LH2 target, 30 uA, ps6=0, all other ps=-1
            1. Reduce current if needed to keep Data Rate (CODA)<100MBy/sec, Event rate < 2 KHz, ps6 livetime > 90%
        2. One-hour run LD2 target, 15 uA, ps6=0, all other ps=-1
            1. Reduce current if needed to keep Data Rate (CODA)<100MBy/sec, Event rate < 2 KHz, ps6 livetime > 90%
2. Return to setting KinC_x50_4
    1. Beam Off
    2. Move HMS to 16.917 deg
    3. Set HMS momentum to -5.253 GeV electron (this will require going to MOL)
    4. Set SHMS to 30.69 deg (this is a 1 deg shift from prior KinC_x50_4 running).
    5. Request MCC NPS Sweep on (468 A), tell MCC this is a prior setting in which we ran with Correctors OFF.

Short Term Run-Plan

From HallCWiki

last update: 03-Nov-23. Send comments and corrections to C. Hyde

The Full Run Plan is available to you here for your information. That Full Run Plan is not chronologically ordered. The short-term run plan is outlined below and is regularly updated. The tasks on any given day are at the top of this page (above the line). The tasks below the line are outdated but are kept on this page for reference.

- Angle constraints on Spectrometers [1] (https://logbooks.jlab.org/entry/4179104)
  - Minimum angles: HMS 12.37; SHMS: 28.30;
  - Minimum HMS-NPS Separation (remote) 26.70 deg = Minimum HHS-SHMS separation: 43.00 deg;
- NPS sweeper setup
  - Table of corrector currents for different SHMS/NPS angles: [2] (https://hallcweb.jlab.org/wiki/images/9/93/NPS_angles_currents.pdf): the nominal sweeper setting is 468A.
- Online NPS database of run: https://hallcweb.jlab.org/rcdb (https://hallcweb.jlab.org/rcdb)

- **Friday, November 3:**
  - Enter run #s on this sheet and add to binder at end of shift

- Setting KinC_x50_4'
  - HMS at 16.917 deg
  - HMS momentum -5.253 GeV (electron)
  - SHMS at 30.69 deg (this is a 1 deg shift from prior KinC_x50_4 running).
  - NPS Sweep on (468 A), Correctors OFF.
- Data taking instruction
  - For each current/target/trigger configuration, log rates, NPS anode currents, FADC trigger, and rad levels (see this example (https://logbooks.jlab.org/entry/4196875)).
  - Event rates should be less than 2kHz in all configurations. The CODA Data rate should be less than 100 MByte/sec. Livetime should be above 90% and stable. The livetime can be read on the NPS FADC Scaler screen.

1. KinC_x50_4' data cycle (One cycle is ~10h of data taking at 100% efficiency). All ps=-1 except the unique trigger indicated.
    1. When taking production data (coin_sparse ps6=0), lower the beam current to obtain the desired rates and livetime conditions. Do not increase the ps6 prescale. If you can't obtain the desired conditions with a beam current higher than 4 uA, alert the RC.
    2. Check that the NPS anode currents are below limits (limit shown on the anode current display).
    3. Total run time should be adjusted for beam trip, but any given run should not exceed 1 hour.
    4. LD2 Target
        1. Five 1-h runs at 15 uA, **coin_sparse** , ps6=0,
        2. One 20-min run at 10 uA, coin_sparse, ps6=0,
        3. One 20-min run at 5 uA, coin_sparse, ps6=0,
        4. One 20-min run at 15 uA, coin_sparse, ps3=2 (or as required to keep event rate about 2KHz)
        5. One 40-min run at 10 uA, coin_sparse, ps4=0 (OK if rate is >2kHz provided Data Rate</= 100MBy/sec).
        6. One 20-min run at 5 uA, **coin_sparse_low**, ps6 prescaled as needed to keep CODA Data rate less than 100 MByte/sec.

Short Term Run-Plan

From HallCWiki

Last update: 28-Jan-24. Send comments and corrections to C. Hyde

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  - Minimum angles: HMS 12.37; SHMS: 28.30;
  - Minimum HMS-NPS Separation (remote) 26.70 deg = Minimum HMS-SHMS separation: 43.00 deg;
- NPS sweeper setup
  - Table of corrector currents for different SHMS/NPS angles: [2] (https://hallcweb.jlab.org/wiki/images/9/93/NPS_angles_currents.pdf): the nominal sweeper setting is 468A.
- Online NPS database of run: https://hallcweb.jlab.org/rcdb (https://hallcweb.jlab.org/rcdb)

- **Monday 29 January**
  - 08:00 Escorted Access of Techs only to inspect/clean SHMS rails and verify rolling of encoder wheel
- Change to **KinC_x36_5'**
  - HMS angle 16.435 deg
  - HMS Momentum -4.637 GeV/c (electrons)
  - SHMS angle 30.3 deg (NPS 14.00 deg)
  - Charge goal 0.5 Coul each, LH2 and LD2

30.305 ?
16.430 ?

1. KinC_x36_5' Tuning.
   1. Ask MCC for NPS Sweep ON, tune Correctors starting from (0,0)
      1. Record screenshot of Sweep GUI when tuning done.
   2. If MCC tunes to non-zero Corrector values then do this Optics study (first time only)**Label CODA runs Optics**
      1. Sweep & Correctors ON, HMS Collimator **Sieve** Raster ON
         1. 30 min run: Target Carbon 0.5% , 30 uA, ps4=0, all other ps=-1
         2. 30 min run: Target Optics +/- 8cm , 30 uA, ps4=0, all other ps=-1
      2. Sweep & Correctors OFF, HMS Collimator **Sieve** Raster ON
         1. 30 min run: Target Carbon 0.5% , 30 uA, ps4=0, all other ps=-1
         2. 30 min run: Target Optics +/- 8cm , 30 uA, ps4=0, all other ps=-1
2. KinC_x36_5' Production. **Label CODA runs KinC_x36_5'** EDTM 40 Hz, all ps=0 except as noted
   1. LH2 Target
      1. **Two** 1 hour runs, ps6=0, 30 uA CODA config coin_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
      2. One 20-min run at 20 uA, coin_sparse, ps6=0
      3. One 40-min run at 10 uA, coin_sparse, ps6=0
      4. One 20-min run at 20 uA, coin_sparse, ps4=0
      5. One 15-min run at 40 uA (or same as production), **coin** , ps6=3 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

01/30/2024 Day shift

   2. Dummy Target
      1. 15 min run at 30 uA, coin_sparse, ps6=0
      2. 20 min run at 20 uA, coin_sparse, ps6=0
   3. LD2 Target
      1. **Six** 1-hour runs, ps6=0, 12 uA CODA config coin_sparse, lower current as needed to keep Data Rate < 130 MBy/sec (0.072 C each)
         1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
      2. One 40 min run at 8 uA, coin_sparse, ps6=0
      3. One 40 min run at 5 uA, coin_sparse, ps6=0
      4. One 20-min run at 8 uA, coin_sparse, ps4=0
      5. One 15 min run at 12 uA (or same as production), **coin** , ps6=3 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

stop here

   4. Repeat KinC_x36_5' Production cycle of LH2, Dummy, LD2 once.

End here 07:00 1-Feb-24

BCM Calibration (~1.5 hour, loaded)

Dave Mack updated 9/13/23

Instructions to Hall C shift crew:

1. Give the MCC operator a copy of this procedure. Contact Julie Roche to start the parity daq.

1. Fast Raster on 2x2 (to protect stuff)

2. Target out will make life simpler. (But LH2 or LD2 is in principle OK according to operational restrictions at http://opsweb.acc.jlab.org/internal/ops/ops_webpage/restrictions/ops_restrictions.html .)

3. Ask the MCC operator to show they can stably reach the maximum desired current.

We're only interested in scalers. (Prescale away the NPS if possible.) Check that the Unser and BCM scalers are counting on one of the xscalers screens . When the MCC calls to tell you they are ready, then

go_edtm set 60

4. Start a run labelled "BCM calibration".

5. Make sure the daq keeps running during the procedure until the operator calls to say it is complete. You should keep track of the progress.

6. Replay the run because we need the scalers in the ROOT file. (It may be simplest to use the standard full replay.)

Instructions to the MCC operator:

- A strip chart in the elog of Hall C current vs time would be greatly appreciated.

- Do each of the following currents, plateauing for ~1.5 minutes each. (If you get a trip, then 45 seconds is long enough. But if there's a trip too near the start of beam-on interval, then restart the 1.5 minute clock.)

- Approximate currents are fine. The Hall C Unser will determine the true beam current.

- The zeroes are as important as the beam-on periods. *(No need to close the slit for these.)*

In units of muA:

0, 40, 0, 20, 0, 10, 0, 5, 0, 2.5, 0,

Then 40, 0, 20, 0, 10, 0, 5, 0, 2.5, 0,

40, 0, 20, 0, 10, 0, 5, 0, 2.5, 0.

Let Hall C know when you're done. Thanks!

Jefferson Lab DRAFT

Hall C NPS Sweeper Dipole Setup Procedure

1153

Document Number:

- MCC-PR-06-??? (maybe 013?)

Revision Number:

- Rev. 1b4

Release Date:

- DRAFT

Technical Custodian:

- Lester Richardson

Estimated Time to Perform:

- <20 minutes

When to Use this Procedure:

- The Sweeper dipole must be configured during initial beam setup for the NPS Experiments and then after every spectrometer angle change.

Procedure Overview

This procedure describes how to change the Hall C Sweeper dipole setting and then adjust the beam orbit to the Hall C dump using the upstream and downstream Sweeper correctors. The dipole is ramped to the specified setpoint in discrete steps, with beam orbit correction to the dump viewer following each step.

Prerequisites

1) You have received a request from the Hall C Control Room to change the Sweeper dipole setting, and the request has been approved by the Crew Chief and at least one of the

following: Hall C Subject Matter Expert (Dave Gaskell), Hall C APEL (Jay Benesch), or Hall C Ops Liaison (Lester Richardson).

2) Hall C has specified the new Sweeper dipole setpoint and calculated Sweeper corrector settings (they should be in the Hall C Experiment Binder). You will need to refer to these values when executing this procedure.
3) SHMS should be at the angle intended for the kinematics. All of its magnets should be off.
4) The Hall C target is out of the beam path.
5) The Hall C fast raster is OFF.
6) The Hall C dump viewer must be functional (verified with beam later in this procedure).

Hall C NPS Sweeper Dipole Setup Procedure Steps

____ 1. Verify that all Prerequisites (above) have been met.

____ 2. Start a running ELog entry that includes the requested setpoint.

____ 3. Open the NPS Sweeper Screen (**JMenu→Operations→Magnets→Special Hall Magnets**).

____ 4. Mask the FSD trip points **Low Limit** and **High Limit** for the Sweeper magnet and each of the two correctors. Record this action in the ELog entry.

____ 5. Zero the setpoints for the Sweeper dipole (NPSsweep) and both Sweeper correctors (NPScorrUS & NPScorrDS).

____ 6. Establish 5 μA Tune-Mode beam to the Hall C dump.

____ 7. Steer the Hall C line to zero (±0.5mm) the absolute orbit to the Hall C dump. Steer the absolute orbit at the last two BPMs before the target (IPM3H07A & IPM3H07B) to zero (±0.2mm).

____ 8. Is beam visible on the Hall C dump viewer?

Yes > Go to Step 9

No > If the beam spot is not visible on the Hall C dump viewer, terminate beam to Hall C and contact one of the following for instructions how to proceed: Hall C Subject Matter Expert (Dave Gaskell), Hall C APEL (Jay Benesch), or Hall C Ops Liaison (Lester Richardson). Do not proceed without Crew Chief approval.

____ 9. Ensure that the beam is in the central third of the viewer in X and Y with the settings from Step 7.

____ 10. Terminate beam to Hall C.

____ 11. Ramp the Sweeper dipole (NPSsweep) to 25% of the requested setpoint, while leaving both corrector magnets at 0A.

____ 12. Send 5 μA Tune-Mode beam to Hall C.

____ 13. Ramp the Sweeper correctors (NPScorrUS & NPScorrDS) to 25% of the calculated correction value. Adjust the correctors within +-10% of their set points to get the beam close to the original location.

Is the beam in roughly the same spot on the viewer image as in Step 9***?***

Yes > Go to Step 14.

No > Contact one of the following for instructions how to proceed: Hall C Subject Matter Expert (Dave Gaskell), Hall C APEL (Jay Benesch), or Hall C Ops Liaison (Lester Richardson).

____ 14. Repeat Step 10–Step 13, above, increasing the dipole and corrector setpoints an additional 25% each time until the Sweeper dipole has been ramped to the requested setpoint and the beam is centered on the dump viewer.

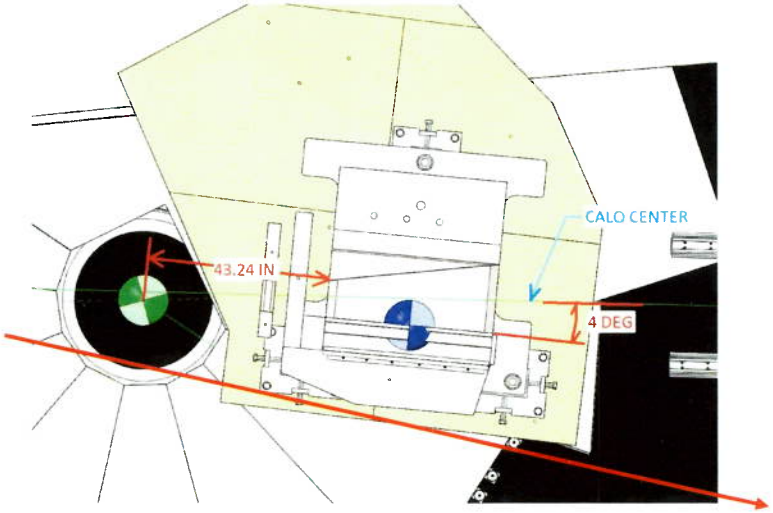
____ 15. Set the FSD trip points **Low Limit** and **High Limit** for the Sweeper dipole and both of the Sweeper correctors to ±5% of their present value.

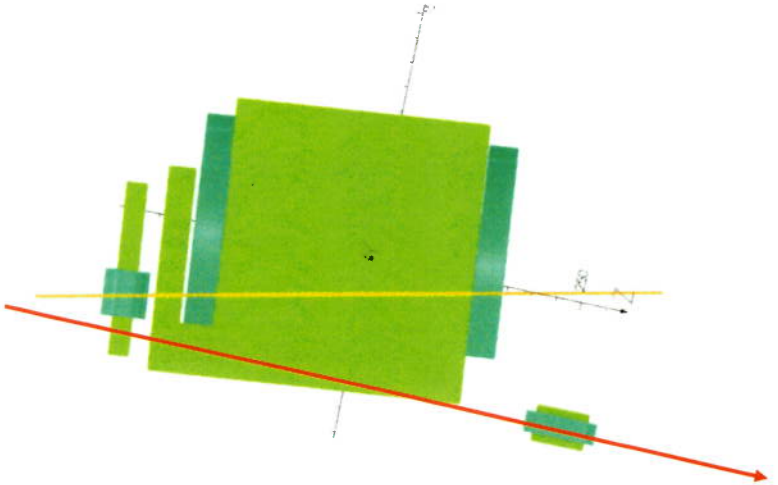
____ 16. Unmask the FSD trip points **Low Limit** and **High Limit** for the Sweeper dipole and both of the Sweeper correctors. Record this action in the ELog entry.

____ 17. Add screenshots of the dump viewer and the *NPS Sweeper Screen* to the running ELog entry and submit the entry.

____ 18. Procedure complete.

Sweeper magnet for NPS (SNPS)

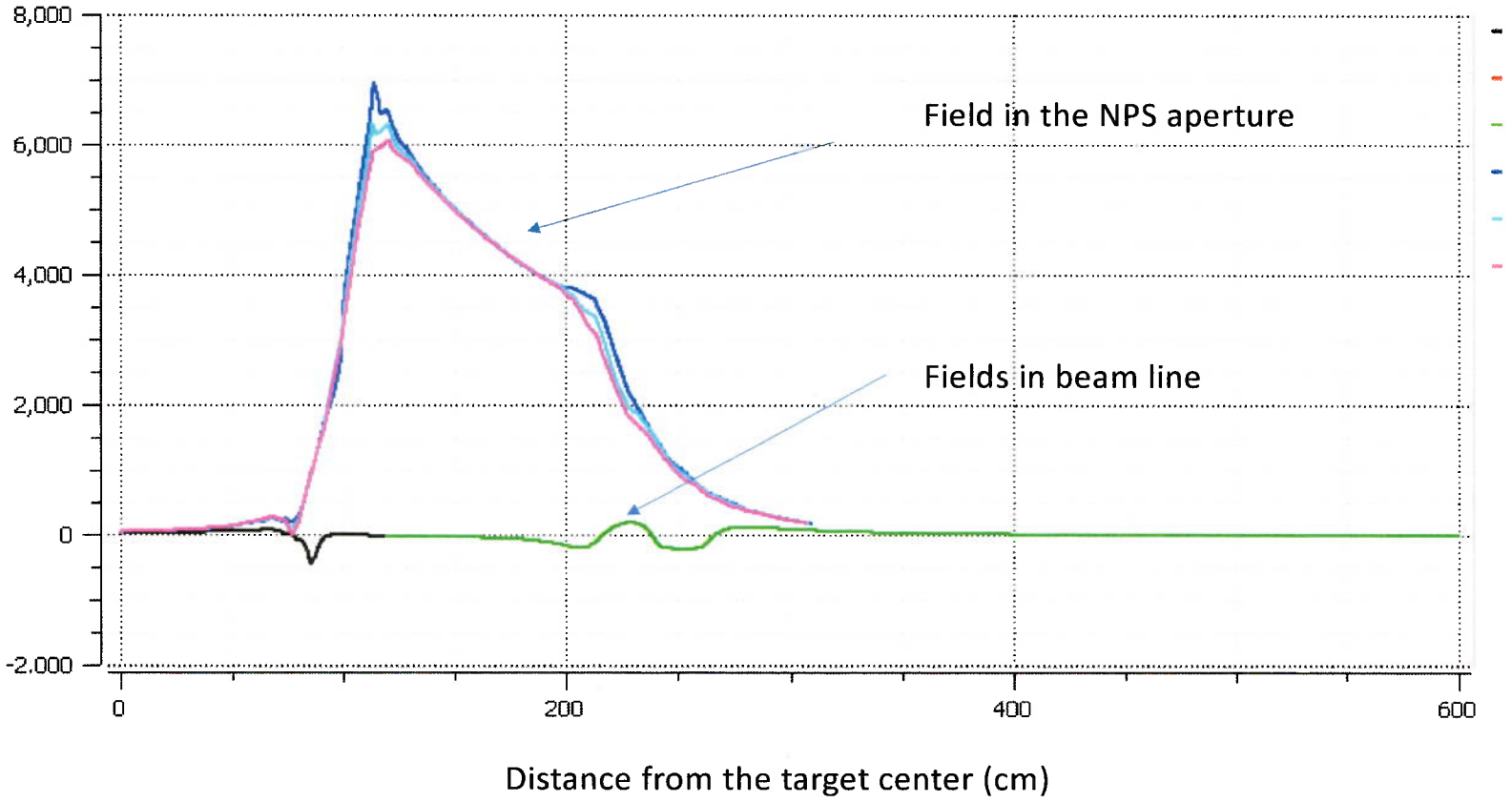




Correctors tuning procedure:

1. Put SNPS at ~10% (48 Amp) and UpStreamCorrector and DownSC at 0%; observe deflection at dump, record the direction of the deflection.
2. Put UpSC at ~10% (10 Amp), observe the deflection at dump, adjust the current, record the deflection.
3. Put DownSC at ~10% (2 Amp), tune it to get beam at the center at dump, record the value and the sign of the optimal current.
4. Ramp currents proportional to the SNPS settings per a table in next slides. Adjust DSC current to made beam at center of dump.

Bx (Gauss) profile in horizontal plane for kin. 25_4



Corrector currents 468 Amp in Sweeper NPS (SNPS)

Setup Name		KinC_x36_1	KinC_x36_2	KinC_x36_3	KinC_x36_4	N1-name	KinC_x36_5
HMS Mom	(GeV)	1.956	4.042	6.117	2.562	4.637	2.416
HMS	(deg)	28.341	17.01	12.373	24.773	16.435	26.849
Calo Angle to beamline	(deg)	11.235	14.364	15.961	9.891	12.117	7.401
SHMS Optics (Camera) Angle	(deg)	27.665	30.794	32.391	26.321	28.547	23.831
Separation angle NPS magnet & Calo to HMS	(deg)	39.576	31.374	28.334	34.664	28.552	34.25
Separation angle SHMS to HMS	(deg)	56.006	47.804	44.764	51.094	44.982	50.68
NPS magnet Wing (beamline shield)		On	On	On	On	On	On
NPS magnet Pole face angle to Beamline	(deg)	7.235	10.364	11.961	5.891	8.117	3.401
NPS magnet Pole face angle to Calo centerline	(deg)	4	4	4	4	4	4
NPS magnet backside yoke angle to CL of Calo	(deg)	113.43	113.43	113.43	113.43	113.43	113.43
Calo-Dist	(m)	3	3	3	4	3	4
HMS Settings based on golden tune							
Q1	(A)	249.8	524.2	805.3	328.6	604.0	309.6
Q2	(A)	169.3	396.1	669.0	230.3	469.5	215.2
Q3	(A)	98.4	202.9	307.5	128.7	232.8	121.4
Dipole	(A)	554.9	1046.4	1808.0	692.0	1220.2	659.3
kBeam	(GeV)	6.397	8.483	10.558	8.483	10.558	10.558
NPS magnet current, Amp	(A)	468	468	468	468	468	468
NPS Upstream Compensation coils, Amp	(A)	-37	-87	-118	-56	-19	-19
NPS downstream Corrector, Amp	(A)	15	10	7	13	23	23

Table of kinematics with expected currents in the SNPS

Corrector currents 468 Amp in Sweeper NPS (SNPS)

KinC_x50_1	KinC_x50_2	KinC_x50_3	KinC_x60_1	KinC_x60_2	KinC_x60_3	N2-name	KinC_x25_1	KinC_x25_2	KinC_x25_3	KinC_x25_4
4.859	6.934	5.442	1.868	3.953	6.028	5.229	2.134	4.22	6.294	4.163
16.512	12.372	16.619	38.136	22.487	16.274	18.976	22.067	13.575	9.952	15.012
19.858	21.432	16.241	13.171	17.383	19.498	16.852	10.282	12.74	14.017	9.367
36.288	37.862	32.671	29.601	33.813	35.928	33.282	26.712	29.17	30.447	25.797
36.37	33.804	32.86	51.307	39.87	35.772	35.828	32.349	26.315	23.969	24.379
52.8	50.234	49.29	67.737	56.3	52.202	52.258	48.779	42.745	40.399	40.809
On	On	On	On	On	On	On	On	On	Off	Off
15.858	17.432	12.241	9.171	13.383	15.498	12.852	6.282	8.74	10.017	5.367
4	4	4	4	4	4	4	4	4	4	4
113.43	113.43	113.43	113.43	113.43	113.43	113.43	113.43	113.43	113.43	113.43
3	3	3	3	3	3	3	6	4	4	6
633.9	918.3	713.0	238.4	512.3	793.1	684.0	272.9	548.0	829.7	540.4
497.9	789.4	575.0	160.8	385.4	656.3	546.4	186.8	417.6	694.4	410.7
244.0	348.8	273.4	94.0	198.4	303.0	262.6	107.3	211.8	316.4	208.9
1292.6	2266.1	1507.0	534.4	1022.6	1764.6	1424.3	595.7	1095.7	1897.8	1079.7
8.483	10.558	10.558	6.397	8.483	10.558	10.558	6.397	8.483	10.558	10.558
468	468	468	468	468	468	468	468	468	468	468
-93	-87	-93	-62	-93	-124	-124	-37	-50	19	-12
-5	-9	7	12	4	4	4.5	16	14	-4	9

Table of kinematics with expected currents in the SNPS

UP ... 124

D ... 4

S 468

Short Term Run-Plan

From HallCWiki

1857

The sections in italic refer to offline analysis by experts.

The Full Run Plan is available to you here for your information. That Full Run Plan is not chronologically ordered. The short-term run plan is outlined below. The tasks on any given day should be at the top of this page. The page will be updated regularly. Tasks below the line might or might not be completed and are kept on this page for reference.

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  - Minimum angles: HMS 12.37; SHMS: 28.30;
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- Online nps database of run: https://hallcweb.jlab.org/rcdb (https://hallcweb.jlab.org/rcdb)

Saturday 14 Oct 2023 Swing Shift

- KinC_x60_3 Kinematics
  - SHMS angle 35.02 deg [NPS 18.72 deg]
  - HMS angle 16.483 Momentum -5.878 GeV (electrons)
  - NPS Sweep On 468 Amp, Correctors OFF
- HMS Large Collimator
- All ps=-1 except as noted (ONLY 1 TRIGGER!)

1858 } Sweeper
1859 } was off
:(

1. KinC_x60_3 cycle, start from end of Saturday Day
   1. LD2 Target
   2. LH2 Target
   3. Dummy Target
      1.
      2. 20 min run at 8 uA, coin_sparse, ps6=0, 1858
   4. LD2 Target 1859, 1862, 1863, 1864, [illegible]
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0,
   5. LD2 Target
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0,
      2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=3 (or as required to keep event rate about 2KHz)
      3. 40 min run at 14 uA , ps6=0
      4. 40 min run at 7 uA, ps6=0
   6. LH2 Target
      1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
      2. 40 min run at 20 uA
      3. 40 min run at 10 uA
   7. Dummy Target
      1. 20 min run at 30 uA, coin_sparse, ps6=0
      2. 20 min run at 8 uA
   8. LD2 Target
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0

2. KinC_x60_3 cycle
    1. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0,
        2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=3 (or as required to keep event rate about 2KHz)
        3. 20 min SPARSIFICATION OFF run at 20 uA, coin, ps3=4 or as needed to keep data rate ≤ 100 MBy/sec
    2. LH2 Target
        1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
        2. 20-minute Efficiency run at 30 uA, coin_sparse, ps3=2 (or as required to keep event rate about 2KHz)
        3. 20 min SPARSIFICATION OFF run at 30 uA, coin, ps3=3 or as needed to keep data rate ≤ 100 MBy/sec
    3. Dummy Target
        1. 20 min run at 30 uA, coin_sparse, ps6=0,
        2. 20 min run at 8 uA,
    4. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0,
    5. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0,
        2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=3 (or as required to keep event rate ≤ 2KHz)
        3. 40 min run at 14 uA , ps6=0
        4. 40 min run at 7 uA, ps6=0
    6. LH2 Target
        1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
        2. 40 min run at 20 uA
        3. 40 min run at 10 uA
    7. Dummy Target
        1. 20 min run at 30 uA, coin_sparse, ps6=0
        2. 20 min run at 8 uA
    8. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0

The instructions below are for previous shifts and are kept here for the record.

Friday 13 Oct 2023 Swing Shift

- KinC_x60_3 Kinematics
    - SHMS angle 35.02 deg [NPS 18.72 deg]
    - HMS angle 16.483 Momentum -5.878 GeV (electrons)
    - NPS Sweep On 468 Amp, Correctors OFF
- HMS Large Collimator
- All ps=-1 except as noted (ONLY 1 TRIGGER!)

1. Complete the Thursday Program below 1.6 -- 1.8
2. KinC_x60_3 cycle
    1. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0, **runs 1838, 1839, 1840**
        2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event

Short Term Run-Plan

1855

From HallCWiki

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- Angle constraints on Spectrometers [1] (https://logbooks.jlab.org/entry/4179104)
  - Minimum angles: HMS 12.37; SHMS: 28.30;
  - Minimum HMS-NPS Separation (remote) 26.70 deg = Minimum HHS-SHMS separation: 43.00 deg;
- NPS sweeper setup
  - Table of corrector currents for different SHMS/NPS angles: [2] (https://hallcweb.jlab.org/wiki/images/9/93/NPS_angles_currents.pdf): the nominal sweeper setting is 468A.
- Online nps database of run: https://hallcweb.jlab.org/rcdb (https://hallcweb.jlab.org/rcdb)

Friday 13 Oct 2023 Swing Shift

- KinC_x60_3 Kinematics
  - SHMS angle 35.02 deg [NPS 18.72 deg]
  - HMS angle 16.483 Momentum -5.878 GeV (electrons)
  - NPS Sweep On 468 Amp, Correctors OFF
- HMS Large Collimator
- All ps=-1 except as noted (ONLY 1 TRIGGER!)

1. Complete the Thursday Program below 1.6 -- 1.8
2. KinC_x60_3 cycle
   1. LD2 Target
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0
      2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)
      3. 20 min SPARSIFICATION OFF run at 20 uA, coin, ps3=5 or as needed to keep data rate ≤ 100 MBy/sec
   2. LH2 Target
      1. Four 40-min runs at 30 uA, coin_sparse, ps6=0 1, ?
      2. ✓ 20-minute Efficiency run at 30 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz) 1854
      3. ✓ 20 min SPARSIFICATION OFF run at 30 uA, coin, ps3=5 or as needed to keep data rate ≤ 100 MBy/sec 1856, 1855
   3. Dummy Targ
      1. 20 min run at 30 uA, coin_sparse, ps6=0, 1857
      2. 20 min run at 8 uA,
   4. LD2 Target
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0,
   5. LD2 Targe
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0,
      2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)

Short →

3. 40 min run at 14 uA , ps6=0
4. 40 min run at 7 uA, ps6=0

6. LH2 Target
1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
2. 40 min run at 20 uA
3. 40 min run at 10 uA

7. Dummy Target
1. 20 min run at 30 uA, coin_sparse, ps6=0
2. 20 min run at 8 uA

8. LD2 Target
1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0

3. Repeat until integrated luminosity goal is reached

Thursday 12 Oct 2023 Swing Shift

- Return to KinC_x60_3 Kinematics
  - SHMS angle 35.02 deg [NPS 18.72 deg] (Move SHMS BEFORE HMS in this case to maintain minimum separation)
  - HMS angle 16.483 Momentum -5.878 GeV (electrons)
    - go_magnetsHMS_current -5.878 // will not require MOL
  - NPS Sweep On 468 Amp, Correctors OFF (already tested)
- HMS Large Collimator
- All ps=-1 except as noted (ONLY 1 TRIGGER!)

1. KinC_x60_3 cycle
1. LD2 Target
1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0
2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)
3. 20 min SPARSIFICATION OFF run at 20 uA, coin, ps6 as needed to keep data rate ≤ 100 MBy/sec

2. LH2 Target
1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
2. 20-minute Efficiency run at 30 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)
3. 20 min SPARSIFICATION OFF run at 30 uA, coin, ps6 as needed to keep data rate ≤ 100 MBy/sec

3. Dummy Targ
1. 20 min run at 30 uA, coin_sparse, ps6=0, **run 1815**
2. 20 min run at 8 uA, **run 1816**

4. LD2 Target
1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0, **runs 1817, 1818, 1819**

5. LD2 Target
1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0, **runs 1820, 1821, 1822**
2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)
3. 40 min run at 14 uA , ps6=0
4. 40 min run at 7 uA, ps6=0

6. LH2 Target
1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
2. 40 min run at 20 uA
3. 40 min run at 10 uA

7. Dummy Target
1. 20 min run at 30 uA, coin_sparse, ps6=0
2. 20 min run at 8 uA

8. LD2 Target
1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0

2. Repeat until integrated luminosity goal is reached

Short Term Run-Plan

From HallCWiki

Back at 1839

The sections in italic refer to offline analysis by experts.

The Full Run Plan is available to you here for your information. That Full Run Plan is not chronologically ordered. The short-term run plan is outlined below. The tasks on any given day should be at the top of this page. The page will be updated regularly. Tasks below the line might or might not be completed and are kept on this page for reference.

- Angle constraints on Spectrometers [1] (https://logbooks.jlab.org/entry/4179104)
  - Minimum angles: HMS 12.37; SHMS: 28.30;
  - Minimum HMS-NPS Separation (remote) 26.70 deg = Minimum HHS-SHMS separation: 43.00 deg;
- NPS sweeper setup
  - Table of corrector currents for different SHMS/NPS angles: [2] (https://hallcweb.jlab.org/wiki/images/9/93/NPS_angles_currents.pdf): the nominal sweeper setting is 468A.
- Online nps database of run: https://hallcweb.jlab.org/rcdb (https://hallcweb.jlab.org/rcdb)

Thursday 12 Oct 2023 Swing Shift

- Return to KinC_x60_3 Kinematics
  - SHMS angle 35.02 deg [NPS 18.72 deg] (Move SHMS BEFORE HMS in this case to maintain minimum separation)
  - HMS angle 16.483 Momentum -5.878 GeV (electrons)
    - go_magnetsHMS_current -5.878 // will not require MOL
  - NPS Sweep On 468 Amp, Correctors OFF (already tested)
- HMS Large Collimator
- All ps=-1 except as noted (ONLY 1 TRIGGER!)

1. KinC_x60_3 cycle
   1. LD2 Target
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0
      2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)
      3. 20 min SPARSIFICATION OFF run at 20 uA, coin, ps6 as needed to keep data rate ≤ 100 MBy/sec
   2. LH2 Target
      1. Four 40-min runs at 30 uA, coin_sparse, ps6=0 ✓✓✓✓
      2. 20-minute Efficiency run at 30 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz) ✓
      3. 20 min SPARSIFICATION OFF run at 30 uA, coin, ps6 as needed to keep data rate ≤ 100 MBy/sec ✓ 1817
   3. Dummy Target
      1. 20 min run at 30 uA, coin_sparse, ps6=0 1815
      2. 20 min run at 8 μA ✓ 1816
   4. LD2 Target
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0 ✓✓✓ 1817, 1818, 1819
   5. LD2 Target
      1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0 ✓✓✓ 1820, 1821, 1822
      2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz) ✓

In progress 05:44, 10/13/23 ps6=0

3. 40 min run at 14 uA
4. 40 min run at 7 uA

6. LH2 Target
    1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
    2. 40 min run at 20 uA
    3. 40 min run at 10 uA
7. Dummy Target
    1. 20 min run at 30 uA, coin_sparse, ps6=0
    2. 20 min run at 8 uA
8. LD2 Target
    1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0

2. Repeat until integrated luminosity goal is reached

-

The instructions below are for previous shifts and are kept here for the record.

Tuesday 10 Oct 2023 Day Shift

- Change to KinC_x60_3 Kinematics
    - HMS angle 16.483 (Move HMS BEFORE SHMS) Momentum -5.878 GeV (electrons)
        - go_magnetsHMS_current -5.878 // will not require MOL
    - SHMS angle 35.02 deg [NPS 18.72 deg]
    - NPS Sweep On 468 Amp, Correctors OFF (already tested)
- HMS Large Collimator
- All ps=-1 except as noted (ONLY 1 TRIGGER!)

1. KinC_x60_03 cycle 1
    1. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0 **Runs 1753, 1756, 1757**
        2. 40 min run at 14 uA **Run 1758**
        3. 40 min run at 7 uA **Run 1759**
    2. LH2 Target
        1. Four 40-min runs at 30 uA, coin_sparse, ps6=0 **Runs 1760,**
        2. 40 min run at 20 uA
        3. 40 min run at 10 uA
    3. Dummy Target
        1. 20 min run at 30 uA, coin_sparse, ps6=0
    4. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0 **We are here at 11am, Wednesday, run 1768, 1769, 1770 (short)**
2. KinC_x60_03 cycle 2
    1. LD2 Target
        1. Three 40-minute runs at 20 uA, coin_sparse, ps6=0
        2. 20-minute Efficiency run at 20 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)
        3. 20 min SPARSIFICATION OFF run at 20 uA, coin, ps6 as needed to keep data rate ≤ 100 MBy/sec
    2. LH2 Target
        1. Four 40-min runs at 30 uA, coin_sparse, ps6=0
        2. 20-minute Efficiency run at 30 uA, coin_sparse, ps3=5 (or as required to keep event rate ≤ 2KHz)
        3. 20 min SPARSIFICATION OFF run at 30 uA, coin, ps6 as needed to keep data rate

Short Term Run-Plan

./run_hms.com.sh 166

From HallCWiki

The sections in italic refer to offline analysis by experts.

The Full Run Plan is available to you here for your information. That Full Run Plan is not chronologically ordered. The short-term run plan is outlined below. The tasks on any given day should be at the top of this page. The page will be updated regularly. Tasks below the line might or might not be completed and are kept on this page for reference.

Angle constraints on Spectrometers [1] (https://logbooks.jlab.org/entry/4179104)

Minimum angles: HMS 12.37; SHMS: 28.30; separation: 48.30 deg; Table of corrector currents for different SHMS/NPS angles: [2] (https://hallcweb.jlab.org/wiki/images/9/93/NPS_angles_currents.pdf): the nominal setting is 468A.

Online nps database of run: https://hallcweb.jlab.org/rcdb (https://hallcweb.jlab.org/rcdb)

Friday 6 Oct 2023 Swing through Saturday Owl

1. 1. LD2 Target
   - √1. One 20-minute run on LD2, ps6=0, 15 uA, Sweep magnet current=~~648~~ 468 A
   - √2. One 20-minute run on LD2, ps6=0, 15 uA, Sweep magnet current=324 A (ask MCC to lower this current for you)
   - √3. One 20-minute run on LD2, ps6=0, 15 uA, Sweep magnet current=0 A (ask MCC to lower this current for you)
   - √4. Return sweep magnet to ~~648~~ 468 A
   - XX 5. Two 1-hour runs on LD2, ps6=0, 15 uA

1. New KinC_x50_2 'cycle'
   1. LD2 Target
      - Already done √1. Efficiency run 20min LD2, 15 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
      - Already done √2. Efficiency run 20min LD2, 10 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
      - Already done √3. Efficiency run 20min LD2, 5 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
      - 4. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)
   2. LH2 Target
      - 1. Three 1-hour runs on LH2, ps6=0, 30 uA (0.108 C per run) Owl shift End Here
      - √2. Efficiency run 20min LH2, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      - Check Trigger rate. √3. Efficiency run 20min LH2, 20 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      - √4. Efficiency run 20min LH2, 10 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
   3. Dummy Target
      - √1. 30 min run at 30 uA (0.054 C), ps6=0
      - √2. Efficiency run 20min dummy, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      - √3. Efficiency run 20min dummy, 20 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      - √4. Efficiency run 20min dummy, 10 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
   4. LD2 Target
      - 1. ~~Three~~ Four 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run) 45 min 1684, 1688, 1690, 1691

Rates

Saturday 7 Oct 2023

1689

1. New KinC_x50_2 'cycle'
   1. LD2 Target
      - 1. Efficiency run 30min LD2, 15 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA←
      - 4 45min → 2. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)
   2. LH2 Target
      - 4 45min → 1. Three 1-hour runs on LH2, ps6=0, 30 uA (0.108 C per run)
      - 2. Efficiency run 30min LH2, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA (0.054 C)

3. Dummy Target
    1. 30 min run at 30 uA (0.054 C), ps6=0
4. LD2 Target
    1. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)

4-45 min →

Sunday 8 Oct 2023 Day shift

1. Moller polarization measurement (D. Gaskell)

- Move to KinC_x60_3
    - HMS angle = 16.483 deg (Move HMS **before** SHMS). P_HMS = -5.878 (electrons)
    - SHMS angle = 35.02 deg
    - Expected HMS LH2-DIS rate = 1 KHz, DVCS photon energy = 5 GeV
- CD2-MS rate = 2KHz
-

The instructions below are for previous shifts and are kept here for the record.

Thursday 05 Oct 2023, Starting with Swing Shift

- KinC_x50_2 Production
    - SHMS at 36.88 deg (NPS at 20.58).
    - HMS -6.667 GeV (electrons), angle 12.493 deg
    - All CODA ps = -1, except as noted.

1. Complete previous cycle, Complete new entries on Run Sheets, Record charge/run in Shift Summary
    1. CODA Configuration coin_sparse,
    2. LH2 Target
        1. NPS Sweep magnet OFF
            1. 30 min run on LH2, ps6=0, 30 uA (0.054 C)
        2. NPS Sweep Magnet ON
            1. 30 min run on LH2, ps6=0, 30 uA (0.054 C)
            2. 30 min run on LH2, ps6=0, 30 uA (0.054 C)
            3. Efficiency Run 30 min LH2 30uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA (0.054 C)
            4. 30 min run on Dummy at 30 uA (0.054 C), ps6=0
    3. LD2 Target
        1. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)
2. New KinC_x50_2 'cycle'
    1. LD2 Target
        1. Efficiency run 30min LD2, 15 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
        2. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run) **Owl Friday completed runs 1643, 1644, 1645**
    2. LH2 Target
        1. Two 1-hour runs on LH2, ps6=0, 30 uA (0.108 C per run)
        2. Special run with _PAIR_THR=600 in nps-vtp.cfg file,
            1. One-hour run on LH2, ps6=0, adjust current to keep hTRIG6 rate < 2 KHz
        3. Restore _PAIR_THR=950 in nps-vtp.cfg file
        4. Efficiency run 30min LH2, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA (0.054 C)
        5. Efficiency run 15 min LH2, 10 uA ps3=2 or as necessary for ≤ 2 kHz trigger rate to CODA (0.09 C)
    3. Dummy Target
        1. 30 min run at 30 uA (0.054 C), ps6=0
    4. LD2 Target
        1. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)

Short Term Run-Plan

From HallCWiki

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Minimum angles: HMS 12.37; SHMS: 28.30; separation: 48.30 deg; Table of corrector currents for different SHMS/NPS angles: [2] (https://hallcweb.jlab.org/wiki/images/9/93/NPS_angles_currents.pdf): the nominal setting is 468A.

Online nps database of run: https://hallcweb.jlab.org/rcdb (https://hallcweb.jlab.org/rcdb)

Friday 6 Oct 2023 Swing through Saturday Owl

1. 1. LD2 Target
   1. One 20-minute run on LD2, ps6=0, 15 uA, Sweep magnet current=~~648 A~~ 468A
   2. One 20-minute run on LD2, ps6=0, 15 uA, Sweep magnet current=~~324 A~~ (ask MCC to lower this current for you) 234A
   3. One 20-minute run on LD2, ps6=0, 15 uA, Sweep magnet current=0 A (ask MCC to lower this current for you)
   4. Return sweep magnet to ~~648~~ 468 A
   5. Two 1-hour runs on LD2, ps6=0, 15 uA

1. New KinC_x50_2 'cycle'
   1. LD2 Target
      1. Efficiency run 20min LD2, 15 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
      2. Efficiency run 20min LD2, 10 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
      3. Efficiency run 20min LD2, 5 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
      4. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)
   2. LH2 Target
      1. Three 1-hour runs on LH2, ps6=0, 30 uA (0.108 C per run)
      2. Efficiency run 20min LH2, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      3. Efficiency run 20min LH2, 20 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      4. Efficiency run 20min LH2, 10 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
   3. Dummy Target
      1. 30 min run at 30 uA (0.054 C), ps6=0
      2. Efficiency run 20min dummy, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      3. Efficiency run 20min dummy, 20 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
      4. Efficiency run 20min dummy, 10 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA
   4. LD2 Target
      1. ~~Three 1-hour~~ 4 × 45 minute runs on LD2, ps6=0, 15 uA (0.054 C per run) ← 4× 45 min

Saturday 7 Oct 2023

1. New KinC_x50_2 'cycle'
   1. LD2 Target
      1. Efficiency run 30min LD2, 15 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
      2. ~~Three 1-hour~~ runs on LD2, ps6=0, 15 uA (0.054 C per run) 4×45 min.
   2. LH2 Target
      1. Three 1-hour runs on LH2, ps6=0, 30 uA (0.108 C per run)
      2. Efficiency run 30min LH2, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA (0.054 C)

3. Dummy Target
    1. 30 min run at 30 uA (0.054 C), ps6=0
4. LD2 Target
    1. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)

Sunday 8 Oct 2023 Day shift

1. Moller polarization measurement (D. Gaskell)

- Move to KinC_x60_3
    - HMS angle = 16.483 deg (Move HMS **before** SHMS). P_HMS = -5.878 (electrons)
    - SHMS angle = 35.02 deg
    - Expected HMS LH2-DIS rate = 1 KHz, DVCS photon energy = 5 GeV
-
-

The instructions below are for previous shifts and are kept here for the record.

Thursday 05 Oct 2023, Starting with Swing Shift

- KinC_x50_2 Production
    - SHMS at 36.88 deg (NPS at 20.58).
    - HMS -6.667 GeV (electrons), angle 12.493 deg
    - All CODA ps = -1, except as noted,

1. Complete previous cycle, Complete new entries on Run Sheets, Record charge/run in Shift Summary
    1. CODA Configuration coin_sparse,
    2. LH2 Target
        1. NPS Sweep magnet OFF
            1. 30 min run on LH2, ps6=0, 30 uA (0.054 C)
        2. NPS Sweep Magnet ON
            1. 30 min run on LH2, ps6=0, 30 uA (0.054 C)
            2. 30 min run on LH2, ps6=0, 30 uA (0.054 C)
            3. Efficiency Run 30 min LH2 30uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA (0.054 C)
            4. 30 min run on Dummy at 30 uA (0.054 C), ps6=0
    3. LD2 Target
        1. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)
2. New KinC_x50_2 'cycle'
    1. LD2 Target
        1. Efficiency run 30min LD2, 15 uA, ps3=5 or as necessary for ≤ 2 kHz trigger rate to CODA
        2. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run) **Owl Friday completed runs 1643, 1644, 1645**
    2. LH2 Target
        1. Two 1-hour runs on LH2, ps6=0, 30 uA (0.108 C per run)
        2. Special run with _PAIR_THR=600 in nps-vtp.cfg file,
            1. One-hour run on LH2, ps6=0, adjust current to keep hTRIG6 rate < 2 KHz
        3. Restore _PAIR_THR=950 in nps-vtp.cfg file
        4. Efficiency run 30min LH2, 30 uA, ps3=4 or as necessary for ≤ 2 kHz trigger rate to CODA (0.054 C)
        5. Efficiency run 15 min LH2, 10 uA ps3=2 or as necessary for ≤ 2 kHz trigger rate to CODA (0.09 C)
    3. Dummy Target
        1. 30 min run at 30 uA (0.054 C), ps6=0
    4. LD2 Target
        1. Three 1-hour runs on LD2, ps6=0, 15 uA (0.054 C per run)