

# Short Term Run-Plan

From HallCWiki

**Last update: 15:15 23-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available [NPS\\_Completion\\_2024.pdf](#) (modified 22-Feb-2024). 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 The tasks below the line are outdated but are kept on this wiki for reference.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 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](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>)
- **23-Feb-2024** . Start of KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

## 1. KinC\_x36\_6 Tuning

### 1. Tuning NPS Sweep & Correctors

1. With NPS Sweep at 468 Amp, transport of beam to dump is fine with correctors off,
2. Transport to dump is fine for any proportional setting of (up,down) correctors up to (19,23).
3. NPS Calo Anode currents were 10% lower on LH2 with correctors off relative to on, so we will proceed with correctors off

### 2. Luminosity/background scans with correctors off were semi catastrophic. CODA runs "Lumi-Scan"

- Final production settings
  1. Turn off HV to column 0 & 1
  2. LH2 run at 5 uA, max anode current (column 2) is 7 uA. hTRIG1 >2e6 at present threshold values
  3. LD2 run at 3 uA, max anode current column 2 is 7 uA.
    - Label CODA runs "Lumi-Scan"

### 3. Took reference LD2 run 4588, 30 min at 2 uA

## 2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- HMS Collimator LARGE
- Critical to adjust beam current to keep NPS Calo Anode current Max < 10 uA
- Need positron runs (HMS polarity reversed) with 10% of beam time (scheduled for Monday)
- **Keep careful watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**
  - As needed, stop and restart coda run. If this is not sufficient, reboot all NPS crates (see howto link above)

### 1. LH2 Production

#### 578 1. **Eight 30-min runs , ps4=0 5 uA** , CODA config coin\_sparse

- First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
- 2. One 20-min run at 3 uA, coin\_sparse, ps4=0
- 3. One 30-min run at 2 uA, coin\_sparse, ps4=0

4. One 15-min run at 5 uA (or same as production), **coin** , ps4=0
5. First cycle only: One 20-min run at 5 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Dummy Target
  1. 30 min run at 5 uA, coin\_sparse, ps4=0
  2. 20 min run at 3 uA, coin\_sparse, ps4=0
  3. 20 min run at 2 uA, coin\_sparse, ps4=0: (First cycle only)
3. LD2 Target
  1. **Sixteen 30-min runs**, ps4=0, **3 uA** CODA config coin\_sparse,
    - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  - 2. One 20 min run at 1 uA, coin\_sparse, ps4=0 (Skip if MCC cannot control 1uA)
  3. One 20 min run at 2 uA, coin\_sparse, ps4=0
  4. One 15 min run at 3 uA (or same as production), **coin** , ps4=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  5. First cycle only: One 20-min run at 3 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
3. Repeat Full LH2+Dummy+LD2 cycle until Monday ~noon

▪ **Monday 26-Feb-2024 day shift**

1. Positron run
  1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
    1. Ramp to 0
    2. Switch polarity
    3. use go\_magnets to ramp all magnets to MOL, then setpoint
    4. Adjust final Dipole current in small steps to get exact field in NMR lock
  2. Complete one cycle (18 hours?) of positron running.
  3. LH2 Production
    1. **Eight 30-min runs** , ps4=0 **5 uA** , CODA config coin\_sparse
  4. Dummy Target
    1. 30 min run at 5 uA, coin\_sparse, ps4=0
    2. 30 min run at 2 uA, coin\_sparse, ps4=0
  5. LD2 Target
    1. **Sixteen 30-min runs**, ps4=0, **2 uA** , CODA config coin\_sparse,
2. Switch back to electrons Tuesday morning.

▪ **Tuesday 27-Feb-2024 day shift**

- Reverse HMS polarity back to -2.416 GeV/c (electrons)
- Resume LH2+Dummy+LD2 cycles
- Continue until 07:30 am Monday 4-March-2024

▪ **Wednesday 28-Feb-2024 day shift** SAD

▪ **Thursday 29-Feb-2024 day shift** Moller

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

- 
- **23-Feb-2024** . Start of KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

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
5. Return HMS Collimator to **LARGE**
2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**
  - Electron count rate in HMS ~ 200 Hz, so run with ps4=0
  - Critical to adjust beam current to keep hTRIG1 <2.4e6 Hz and NPS Calo Anode current Max < 10 uA
  - Need positron runs (HMS polarity reversed) with 10% of beam time (scheduled for Monday)
  - **Keep careful watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**
    - As needed, stop and restart coda run. If this is not sufficient, reboot all NPS crates (see howto link above)
1. LH2 Production
  1. **Eight 30-min runs , ps4=0** , 30 uA (or as determined from Lumi-Scan, and hTRIG1<2.4e6). CODA config coin\_sparse
    - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  2. One 20-min run at 20 uA, coin\_sparse, ps4=0
  3. One 30-min run at 15 uA, coin\_sparse, ps4=0
  4. One 40-min run at 10 uA, coin\_sparse, ps4=0
  5. One 15-min run at 30 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  6. First cycle only: One 20-min run at 20 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Dummy Target
  1. 20 min run at 30 uA, coin\_sparse, ps4=0
  2. 20 min run at 20 uA, coin\_sparse, ps4=0
  3. 20 min run at 10 uA, coin\_sparse, ps4=0: (First cycle only)
3. LD2 Target
  1. **Sixteen 30-min runs**, ps4=0, **15 uA** (or as determined from Lumi-Scan, and hTRIG1<2.4e6) CODA config coin\_sparse,
    - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  2. One 20 min run at 12 uA, coin\_sparse, ps4=0
  3. One 30 min run at 8 uA, coin\_sparse, ps4=0
  4. One 40-min run at 6 uA, coin\_sparse, ps4=0
  5. One 15 min run at 15 uA (or same as production), **coin** , ps4=2 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  6. First cycle only: One 20-min run at 10 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
3. Repeat Full LH2+Dummy+LD2 cycle until Monday ~7:30 am
  - **Monday 26-Feb-2024 day shift**
1. Positron run
  1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
    1. Ramp to 0
    2. Switch polarity
    3. use go\_magnets to ramp all magnets to MOL, then setpoint
    4. Adjust final Dipole current in small steps to get exact field in NMR lock
  2. Complete one cycle (24 hours?) of positron running. All ps factors same as above (positrons are electrons to the Cherenkov).
2. Switch back to electrons Tuesday morning.
  - **Tuesday 27-Feb-2024 day shift**
    - Reverse HMS polarity back to -2.416 GeV/c (electrons)
    - Resume LH2+Dummy+LD2 cycles
    - Continue until 07:30 am Monday 4-March-2024
  - **Wednesday 28-Feb-2024 day shift** SAD
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  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

## 1. KinC\_x36\_6 Tuning

### 1. Target "Out-of-Beam"

1. Ask MCC to tune NPS Sweep and Correctors to sweep current 468 Amp,
  - **Ask MCC to report minimal and maximal acceptable corrector settings in range (0,0) to upstream=19Amp, Downstream=23Amp.**
  - Record screenshot of Sweep GUI when tuning done.

### 2. Luminosity/background scan at **Lowest MCC-acceptable corrector setting**

- Label CODA runs "Lumi-Scan"

#### 1. LH2 Target

- For EACH run, record screenshots of "NPS CAL Anode Current", "NPS CAL FADC SCALERS", "NPS VTP SCALERS", "HALL C SCALER DATA"
1. 10 min run 10 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  2. 10 min run 20 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  3. 10 min run 30 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate

#### 2. LD2 Target

- For EACH run, record screenshots of "NPS CAL Anode Current", "NPS CAL FADC SCALERS", "NPS VTP SCALERS", "HALL C SCALER DATA"
1. 10 min run 5 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  2. 10 min run 10 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  3. 10 min run 15 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate

### 3. Repeat Luminosity/background scan at **Highest MCC-acceptable corrector setting**

- Record screenshot of Sweep GUI when tuning done.
- Select desired corrector tune based on which provides lowest values in "NPS CAL Anode Current", "NPS VTP SCALERS", and/or hTRIG1 rate at fixed current.
- Select LH2 and LD2 production currents based on  $hTRIG1 \leq 2.4e6/sec$

### 4. If optimal corrector tune is non-zero then do this Optics study **Label CODA runs Optics**

#### 1. Sweep & Correctors ON, HMS Collimator **Sieve** Raster ON

- Lower beam currents to keep NPS Calo Anode current Max < 10 uA
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

4. One 15-min run at 5 uA (or same as production), **coin** , ps4=0
5. First cycle only: One 20-min run at 5 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Dummy Target
  1. 30 min run at 5 uA, coin\_sparse, ps4=0
  2. 20 min run at 3 uA, coin\_sparse, ps4=0
  3. 20 min run at 2 uA, coin\_sparse, ps4=0: (First cycle only)
3. LD2 Target
  1. **Sixteen 30-min runs**, ps4=0, **2 uA** CODA config coin\_sparse,
    - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  2. One 20 min run at 1 uA, coin\_sparse, ps4=0 (Skip if MCC cannot control 1uA)
  3. One 20 min run at 3 uA, coin\_sparse, ps4=0
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▪ **Monday 26-Feb-2024 day shift**

1. Positron run
  1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
    1. Ramp to 0
    2. Switch polarity
    3. use go\_magnets to ramp all magnets to MOL, then setpoint
    4. Adjust final Dipole current in small steps to get exact field in NMR lock
  2. Complete one cycle (18 hours?) of positron running.
  3. LH2 Production
    1. **Eight 30-min runs** , ps4=0 **5 uA** , CODA config coin\_sparse
  4. Dummy Target
    1. 30 min run at 5 uA, coin\_sparse, ps4=0
    2. 30 min run at 2 uA, coin\_sparse, ps4=0
  5. LD2 Target
    1. **Sixteen 30-min runs**, ps4=0, **2 uA** , CODA config coin\_sparse,
2. Switch back to electrons Tuesday morning.

▪ **Tuesday 27-Feb-2024 day shift**

- Reverse HMS polarity back to -2.416 GeV/c (electrons)
- Resume LH2+Dummy+LD2 cycles
- Continue until 07:30 am Monday 4-March-2024

▪ **Wednesday 28-Feb-2024 day shift** SAD

▪ **Thursday 29-Feb-2024 day shift** Moller

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

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    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

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## 1. KinC\_x36\_6 Tuning

### 1. Tuning NPS Sweep & Correctors

1. With NPS Sweep at 468 Amp, transport of beam to dump is fine with correctors off,
2. Transport to dump is fine for any proportional setting of (up,down) correctors up to (19,23).
3. NPS Calo Anode currents were 10% lower on LH2 with correctors off relative to on, so we will proceed with correctors off

### 2. Luminosity/background scans with correctors off were semi catastrophic. CODA runs "Lumi-Scan"

- Final production settings
  1. Turn off HV to column 0
  2. LH2 run at 5 uA, max anode current (column 1) is 6 uA. hTRIG1 >2e6 at present threshold values
  3. LD2 run at 2 uA, max anode current column 1 is 6 uA.
- Label CODA runs "Lumi-Scan"

### 3. Took reference LD2 run 4588, 30 min at 2 uA

## 2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- HMS Collimator LARGE
- Critical to adjust beam current to keep NPS Calo Anode current Max < 10 uA
- Need positron runs (HMS polarity reversed) with 10% of beam time (scheduled for Monday)
- **Keep carefull watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**
  - As needed, stop and restart coda run. If this is not sufficient, reboot all NPS crates (see howto link above)

### 1. LH2 Production

1. **Eight 30-min runs , ps4=0 5 uA , CODA config coin\_sparse**
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 3 uA, coin\_sparse, ps4=0
3. One 30-min run at 2 uA, coin\_sparse, ps4=0

Preliminary 5 MeV FC Calibration (0.5 hour, but honestly just guessing)

Dave Mack updated 2/2/24

**Instructions to Hall C shift crew:**

1. Give the MCC operator a copy of this procedure.
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](http://opsweb.acc.jlab.org/internal/ops/ops_webpage/restrictions/ops_restrictions.html) .)

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

3. Start a run labelled "FC calibration".
4. 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.
5. 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:**

- At 10 muA, spend no more than 5 minutes trying to center on the 5 MeV cup. (The sensitivity is about 1% per mm.)
- A strip chart in the elog of Hall C current vs time would be greatly appreciated.
- Do each of the following settings for 30 seconds each. Approximate currents are fine:  
(The end of a row is a good time to take a break!)

Current	5 MeV Faraday Cup State (check off as you go)							
10	Out	In	Out	In	Out	In	Out	
5	Out	In	Out	In	Out	In	Out	
2.5	Out	In	Out	In	Out	In	Out	
1	Out	In	Out	In	Out	In	Out	
0.5	Out	In	Out	In	Out	In	Out	

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





## BCM Calibration (~1.5 hour, loaded)

Dave Mack updated 1/23/24

### Instructions to Hall C shift crew:

1. Give the MCC operator a copy of this procedure.
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](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

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  $\mu\text{A}$ :

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!



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- Online NPS database of run: <https://hallcweb.jlab.org/rcdb> (<https://hallcweb.jlab.org/rcdb>)
- **13-Mar-2024** . KinC\_x50\_0
  - HMS angle = 25.940 deg
  - HMS Momentum = -2.638 (electrons)
  - HMS Collimator LARGE
  - NPS Sweep Magnet ON (468 Amp), MCC tuned to Correctors off 12-Mar-2024
  - HMS Collimator **LARGE**
  - NPS Calorimeter at 4.0 m
  - Raster On 2x2 mm<sup>2</sup> (note lower currents for 3-pass)

## 1. KinC\_x50\_0a Production. Label CODA runs "KinC\_x50\_0a"

- **SHMS angle = 30.300 deg**
- Critical to adjust beam current to keep NPS Calo Anode current Max  $\leq 10$  uA, CODA Data rate  $< 200$  MBy/sec, and hTRIG1  $< 2.5$  MHz
- All ps=-1, except as noted.

### 1. LH2 Target

1. **Eight 30-min runs , ps4=0, Beam 30 uA** , CODA config coin\_sparse
  - **First run of each cycle, record screenshots of scaler rates, NPS CAL Anode Current, NPS CAL FADC SCALERS, CODA Data Rate, CODA Livetime, and CODA Event Rate.**
2. One 20-min run at 20 uA, coin\_sparse, ps4=0
3. One 30-min run at 10 uA, coin\_sparse, ps4=0
4. One 15-min run at 30 uA (or same as production), **coin** , ps4=0 ?
  - (prescaled as needed to keep CODA Data rate less than 200 MB/s)
  - Record screenshots of CODA Data Rate and LiveTime

### 2. Dummy Target

1. 30 min run 30 uA (LH2 production current) and ps4=0 , coin\_sparse
2. 20 min run 15uA (50% LH2 production current) and ps4=0 factors,

coin\_sparse

3. LD2 Target

1. **Sixteen 30-min runs, 15uA, ps4=0**, CODA config coin\_sparse,
  - **13-Mar-2024** Start on fifth run upon beam recovery after SAD
  - **First run of each cycle, make screen shots** of CODA Data Rate, Event Rate, Trigger scalers, Calo Anode current and FADC Scalers screens
2. One 20-min run at 10 uA, coin\_sparse, ps4=0
3. One 30-min run at 5 uA, coin\_sparse, ps4=0
4. One 15-min run at 15 uA (or same as production), **coin** , ps4=2 ?  
(prescaled as needed to keep CODA Data rate less than 200 MB/s)

2. **KinC\_x50\_0b Production. Label CODA runs KinC\_x50\_0b**

- **SHMS angle = 33.910 deg (NPS = 17.610 deg)**

1. LH2 Target

1. **Eight 30-min runs , ps4=0, Beam 30 uA** , CODA config coin\_sparse
  - **First run of each cycle, record screenshots of scaler rates, NPS CAL Anode Current, NPS CAL FADC SCALERS, CODA Data Rate, CODA Livetime, and CODA Event Rate.**
2. One 20-min run at 20 uA, coin\_sparse, ps4=0
3. One 30-min run at 10 uA, coin\_sparse, ps4=0
4. One 15-min run at 30 uA (or same as production), **coin** , ps4=0 ?
  - (prescaled as needed to keep CODA Data rate less than 200 MB/s)
  - Record screenshots of CODA Data Rate and LiveTime

2. Dummy Target

1. 30 min run 30 uA (LH2 production current) and ps4=0 , coin\_sparse
2. 20 min run 15uA (50% LH2 production current) and ps4=0 factors, coin\_sparse

3. LD2 Target

1. **Sixteen 30-min runs, 15uA, ps4=0**, CODA config coin\_sparse,
  - **First run of each cycle, make screen shots** of CODA Data Rate, Event Rate, Trigger scalers, Calo Anode current and FADC Scalers screens
2. One 20-min run at <sup>20</sup>~~10~~ uA, coin\_sparse, ps4=0.
3. One 30-min run at <sup>15</sup>~~5~~ uA, coin\_sparse, ps4=0
4. One 15-min run at <sup>30</sup>~~15~~ uA (or same as production), **coin** , ps4=~~2~~? 2  
(prescaled as needed to keep CODA Data rate less than 200 MB/s)

3. Repeat KinC\_x50\_0a plus KinC\_x50\_0b cycle until 7:00 am 21-Mar-2024

- Include one cycle reverse polarity (positron) run, production runs only, no 'calibration' runs

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

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- **12-Mar-2024** . KinC\_x50\_0
  - HMS angle = 25.940 deg
  - HMS Momentum = -2.638 (electrons) (Switch polarity from elastic

# Short Term Run-Plan

From HallCWiki

**Last update: 26-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available NPS\_Completion\_2024.pdf (modified 22-Feb-2024). 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 wiki 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 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](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>)
- **23-Feb-2024** . Start of KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

## 1. KinC\_x36\_6 Tuning

### 1. Tuning NPS Sweep & Correctors

1. With NPS Sweep at 468 Amp, transport of beam to dump is fine with correctors off,
2. Transport to dump is fine for any proportional setting of (up,down) correctors up to (19,23).
3. NPS Calo Anode currents were 10% lower on LH2 with correctors off relative to on, so we will proceed with correctors off

### 2. Luminosity/background scans with correctors off were semi catastrophic. CODA runs "Lumi-Scan"

- Final production settings
  1. Turn off HV to column 0 & 1
  2. LH2 run at 5 uA, max anode current (column 2) is 7 uA. hTRIG1 >2e6 at present threshold values
  3. LD2 run at 3 uA, max anode current column 2 is 7 uA.
- Label CODA runs "Lumi-Scan"

### 3. Took reference LD2 run 4588, 30 min at 2 uA

### 4. **18:00. 24-Feb-2024** Move Calorimeter back to 6.0 m

## 2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- HMS Collimator LARGE
- Critical to adjust beam current to keep NPS Calo Anode current Max <= 12 uA
- Need positron runs (HMS polarity reversed) with 10% of beam time (rescheduled for Tuesday)
- **Keep carefull watch of 50K replay for sign of NPS crate failure (bands of**

**anomalous values in pages 1, 7, 9, etc.**

- As needed, stop and restart coda run. If this is not sufficient, reboot all NPS crates (see howto link above)

1. LH2 Production (New settings for Saturday evening)

1. **Eight 30-min runs , ps4=0, Beam 12 uA** , CODA config coin\_sparse

- First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
- Make sure maximum anode current in Calo is  $\leq 12$  uA

2. One 20-min run at 8 uA, coin\_sparse, ps4=0

3. One 30-min run at 6 uA, coin\_sparse, ps4=0

4. One 15-min run at 12 uA (or same as production), **coin** , ps4=0

5. First cycle only: One 20-min run at 12 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 30 min run at 12 uA, coin\_sparse, ps4=0

2. 20 min run at 8 uA, coin\_sparse, ps4=0

3. 20 min run at 6 uA, coin\_sparse, ps4=0: (First cycle only)

3. LD2 Target

1. **Twelve 30-min runs**, ps4=0, **8 uA** CODA config coin\_sparse,

- First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens

2. One 20 min run at 6 uA, coin\_sparse, ps4=0 (Skip if MCC cannot control 1uA)

3. One 20 min run at 4 uA, coin\_sparse, ps4=0

4. One 15 min run at 8 uA (or same as production), **coin** , ps4=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

5. First cycle only: One 20-min run at 8 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

3. Repeat Full LH2+Dummy+LD2 cycle until Monday ~11 am

**Monday 26-Feb-2024 day shift**

1. 11:00 am: Turn off all Calo HV. Label CODA runs "DIS"

1. LH2, coin\_sparse, ps4=0

1. 10 min run at 20 uA ✓

2. 10 min run at 12 uA ✓

2. Dummy target, coin\_sparse, ps4=0,

1. 10 min run at 20 uA

2. 10 min run at 8 uA

3. 10 min run at 3 uA, or long enough for 160,000 events

3. Carbon 0.5 X0 (single foil) coin\_sparse, ps4=0

1. 10 min run at 20 uA

2. 10 min run at 12 uA

3. 10 min run at 8 uA

4. 10 min run at 3 uA

4. LD2, coin\_sparse, ps4=0

1. 10 min run at 15 uA

2. 10 min run at 8 uA

3. 10 min run at 6 uA

4. 10 min run at 3 uA

2. BCM Calibration with injector Faraday cup: 13:30

3. Return to production cycle above

2 1/2 hr. LH2  
16 uA

Start here

Coda → production

10:05 AM

2h

▪ **Tuesday 27-Feb-2024 day shift**

1. Positron run

1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
    1. Ramp to 0
    2. Switch polarity
    3. use go\_magnets to ramp all magnets to MOL, then setpoint
    4. Adjust final Dipole current in small steps to get exact field in NMR lock
  2. Complete one cycle (18 hours?) of positron running.
  3. LH2 Production
    1. **Eight 30-min runs , ps4=0 11 uA , CODA config coin\_sparse**
  4. Dummy Target
    1. 30 min run at 11 uA, coin\_sparse, ps4=0
    2. 30 min run at 8 uA, coin\_sparse, ps4=0
  5. LD2 Target
    1. **Twelve 30-min runs, ps4=0, 8 uA , CODA config coin\_sparse,**
2. Switch back to electrons Tuesday morning.

▪ **Tuesday 27-Feb-2024 day shift**

- Reverse HMS polarity back to -2.416 GeV/c (electrons)
- Resume LH2+Dummy+LD2 cycles
- Continue until 07:30 am Monday 4-March-2024

▪ **Wednesday 28-Feb-2024 day shift** SAD

▪ **Thursday 29-Feb-2024 day shift** Moller

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

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- - **23-Feb-2024** . Start of KinC\_x36\_6
    - SHMS 23.80 deg NPS at 7.5 deg
      1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
    - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)
1. KinC\_x36\_6 Tuning
1. Target "Out-of-Beam"
    1. Ask MCC to tune NPS Sweep and Correctors to sweep current 468 Amp,
      - **Ask MCC to report minimal and maximal acceptable corrector settings in range (0,0) to upstream=19Amp, Downstream=23Amp.**
      - Record screenshot of Sweep GUI when tuning done.
  2. Luminosity/background scan at **Lowest MCC-acceptable corrector setting**
    - Label CODA runs "Lumi-Scan"
1. LH2 Target
    - For EACH run, record screenshots of "NPS CAL Anode Current", "NPS CAL FADC SCALERS", "NPS VTP SCALERS", "HALL C SCALER DATA"
      1. 10 min run 10 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
      2. 10 min run 20 uA. CODA config = coin\_sparse. ps4=0, make a note on





# Short Term Run-Plan

From HallCWiki

**Last update: 04-Mar-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available [NPS\\_Completion\\_2024.pdf](#) (modified 22-Feb-2024). 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 wiki for reference.

- Angle constraints on Spectrometers [1] (<https://logbooks.jlab.org/entry/4179104>)
  - Minimum angles: HMS 12.37; SHMS: 25.00?;
  - 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](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>)
- **04-Mar-2024** . KinC\_x25\_4
- 08:00 Access to Hall to rotate/survey spectrometers. Final settings to be verified/modified by S. Lassiter et al
  - Configuration change details: <https://logbooks.jlab.org/entry/4259689>
  - HMS angle = 15.200 deg, Momentum = -4.149 GeV/c (electrons) Field = 1.13586 T
  - SHMS angle= 27.500 deg (NPS 11.200 deg)
    - This is the minimum separation allowable of the two spectrometers. Rotation will be locked-out
  - Move NPS Calorimeter to 4.0 m
- **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto *new instructions.* ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)). *if it doesn't work call Julie*
- **Keep careful watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**
  - As needed, stop and restart coda run. If this is not sufficient, reboot all 5 NPS crates. Follow this NPS DAQ how to ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_DAQ#NPS](https://hallcweb.jlab.org/wiki/index.php/Hall_C_DAQ#NPS)) Make an HCLOG entry.

## 1. KinC\_x\_25\_4 Setup

1. Ask MCC to tune NPS Sweep Magnet to 468 Amp, Expected maximum Corrector settings: Upstream 19 A, Downstream 23 A
2. If optimal corrector tune is non-zero then do this Optics study **Label CODA runs Optics**
  - Take a screen shot of NPS Sweep GUI
    1. Sweep & Correctors ON, HMS Collimator **Sieve** Raster ON
      - Lower beam currents to keep NPS Calo Anode current Max < 10 uA
        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

3. Return HMS Collimator to **LARGE**
2. KinC\_x\_25\_4 Production. Label CODA runs "KinC\_x25\_4" (NPS Calorimeter at 4.0 m)
  - HMS Collimator LARGE
  - Critical to adjust beam current to keep NPS Calo Anode current Max  $\leq 10$  uA, CODA Data rate  $< 130$  MBy/sec
  - NPS Sweep magnet ON 468 Amp, Correctors TBD
  - 2mm x 2mm raster ON
1. LH2 Production
  1. **Eight 30-min runs , ps6=0, Beam 14 uA** , CODA config coin\_sparse
    - First run, record screenshots of scaler rates, NPS CAL Andoe Current, NPS CAL FADC SCALERS, CODA Data Rate, CODA Livetime, and CODA Event Rate,
  2. One 20-min run at 10 uA, coin\_sparse, ps6=0
  3. One 30-min run at 6 uA, coin\_sparse, ps6=0
  4. One 20-min run at 14 uA coin\_sparse, ps4=~~2~~<sup>1</sup>? (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  5. One 15-min run at 14 uA (or same as production), **coin** , ps6=0 ? (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Dummy Target
  1. 30 min run at 14 uA, coin\_sparse, ps6=0 *data rate and anode currents high.*
  2. 20 min run at 7 uA, coin\_sparse, ps6=0 *says its ok*
3. LD2 Target
  1. **Sixteen 30-min runs, ps6=0, 7 uA** CODA config coin\_sparse,
    - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  2. One 20-min run at 5 uA, coin\_sparse, ps6=0
  3. One 30-min run at 4 uA, coin\_sparse, ps6=0
  4. One 20-min run at 7 uA coin\_sparse, ps4=3 ? (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  5. One 15-min run at 7 uA (or same as production), **coin** , ps6=0 ? (prescaled as needed to keep CODA Data rate less than 130 MB/s)
3. Repeat Full LH2+Dummy+LD2 cycle until Sunday 10-Mar-2024 noon
  1. Tuesday Moller
  2. Sunday noon Move HMS, SHMS, NPS calo to 5-pass elastic setting TBD
4. Monday 11-March-2024 7:00 am Pass Change to 3-pass

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

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- **28-Feb-2024** . KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
    - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)
  - **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).
  - **Keep careful watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**

# Short Term Run-Plan

From HallCWiki

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

A full updated Run Plan, Feb-May 2024 is available [NPS\\_Completion\\_2024.pdf](#) (modified 22-Feb-2024). 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 wiki 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 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](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>)
- **28-Feb-2024** . KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)
- **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).
- **Keep careful watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**
  - As needed, stop and restart coda run. If this is not sufficient, reboot all 5 NPS crates. Follow this NPS DAQ how to ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_DAQ#NPS](https://hallcweb.jlab.org/wiki/index.php/Hall_C_DAQ#NPS)) Make an HCLOG entry.
- **After each 50K replay, check HCLOG for possible entry "Scalers in run nnnn are bad!!!"**
  - See entry 4253001 (<https://logbooks.jlab.org/entry/4253001>), send email to [hanjie@jlab.org](mailto:hanjie@jlab.org)
- Wednesday Day Shift SAD
  - After Heidi Fansler is done with work in Hall on HMS, Restore HMS to -2.416 GeV/c (electrons)
    - go\_magnets\_HMS\_current -2.416.
    - Ramp all magnets to MOL, hold for 5 min, then ramp to setpoint.
    - Make a stripchart of ecDI\_B\_True\_NMR to watch/verify convergence of field at setpoint.
    - Adjust final Dipole current in small steps to get exact field in NMR lock to 0.661420(1) Tesla
  - Resume LH2+Dummy+LD2 cycles

- Continue until 07:30 am Monday 4-March-2024

1. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6** (NPS Calorimeter at 6.0 m)

- HMS Collimator LARGE
- Critical to adjust beam current to keep NPS Calo Anode current Max  $\leq$  12 uA
- NPS Sweep magnet ON 468 Amp, Correctors OFF
- 2mm x 2mm raster ON\*

*Start here*

1. LH2 Production

1. **Eight 30-min runs , ps4=0, Beam 12 uA** , CODA config coin\_sparse
2. One 20-min run at 8 uA, coin\_sparse, ps4=0
3. One 30-min run at 6 uA, coin\_sparse, ps4=0
4. One 15-min run at 12 uA (or same as production), **coin** , ps4=0 ?  
(prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target **Wednesday Swing/Thursday Owl Start here after beam recovery**

- **Wednesday swing, Thursday Owl**, expect Hall B will perform Moller and reverse the Half-Wave-Plate
- After HWP switch, **Run the:** "flipper" script ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_IHWP\\_Change\\_Procedure](https://hallcweb.jlab.org/wiki/index.php/Hall_C_IHWP_Change_Procedure))
- 1. 30 min run at 12 uA, coin\_sparse, ps4=0
- 2. 20 min run at 8 uA, coin\_sparse, ps4=0

3. LD2 Target

1. **Twelve 30-min runs**, ps4=0, **8 uA** CODA config coin\_sparse,
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20 min run at 6 uA, coin\_sparse, ps4=0 (Skip if MCC cannot control 1uA)
3. One 20 min run at 4 uA, coin\_sparse, ps4=0
4. One 15 min run at 8 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Repeat Full LH2+Dummy+LD2 cycle until Monday 4-Mar-2024 7:30 am

▪ **07:30 am Monday 4-Mar-2024 Beam Off**

- Remove "Wings" from NPS Sweep.
- Prepare KinC\_x25\_4, HMS+SHMS Angles, separation controlled/verified by Techs in Hall.
  - HMS -4.149 GeV/c, theta = 15.050 deg
  - SHMS = 25.660 deg (NPS = 9.360) nb: HMS-NPS separation = 24.41 deg, HMS-SHMS separation = 40.71
  - Calorimeter at 6.0 m ?

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

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- **27-Feb-2024** . KinC\_x36\_6

*Handwritten notes:*  
 4.950, 5.023, 5.053, 5.095, 5.149, 5.156

# Short Term Run-Plan

From HallCWiki

**Last update: 27-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available NPS\_Completion\_2024.pdf (modified 22-Feb-2024). 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 wiki for reference.

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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](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>)

## ▪ **27-Feb-2024** . KinC\_x36\_6

- SHMS 23.80 deg NPS at 7.5 deg
  1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
- HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

▪ **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).

▪ **Keep careful watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**

- As needed, stop and restart coda run. If this is not sufficient, reboot all 5 NPS crates. Follow this NPS DAQ how to ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_DAQ#NPS](https://hallcweb.jlab.org/wiki/index.php/Hall_C_DAQ#NPS)) Make an HCLOG entry.

▪ **After each 50K replay, check HCLOG for possible entry "Scalers in run nnnn are bad!!!"**

- See entry 4253001 (<https://logbooks.jlab.org/entry/4253001>), send email to [hanjie@jlab.org](mailto:hanjie@jlab.org)

## 1. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6** (NPS Calorimeter at 6.0 m)

- HMS Collimator LARGE
- Critical to adjust beam current to keep NPS Calo Anode current Max  $\leq$  12 uA
- NPS Sweep magnet ON 468 Amp, Correctors OFF
- 2mm x 2mm raster ON

### 1. LH2 Production)

1. **Eight 30-min runs , ps4=0, Beam 12 uA , CODA config coin\_sparse**
2. One 20-min run at 8 uA, coin\_sparse, ps4=0
3. One 30-min run at 6 uA, coin\_sparse, ps4=0
4. One 15-min run at 12 uA (or same as production), **coin** , ps4=0

### 2. Dummy Target

1. 30 min run at 12 uA, coin\_sparse, ps4=0
2. 20 min run at 8 uA, coin\_sparse, ps4=0

### 3. LD2 Target

1. **Twelve 30-min runs, ps4=0, 8 uA CODA config coin\_sparse,**

- First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  - 2. One 20 min run at 6 uA, coin\_sparse, ps4=0 (Skip if MCC cannot control 1uA)
  - 3. One 20 min run at 4 uA, coin\_sparse, ps4=0
  - 4. One 15 min run at 8 uA (or same as production), **coin** , ps4=12 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
- 2. Repeat Full LH2+Dummy+LD2 cycle until Monday 4-Mar-2024 7:30 am

▪ **Tuesday 27-Feb-2024 13:00 \***

1. Luminosity Scan on Carbon 0.5% radlen target
  1. Turn off NPS Calo HV
  2. Carbon 0.5 X0 (single foil) coin\_sparse, ps4=0, Label CODA "DIS"
    1. 10 min run at 20 uA
    2. 10 min run at 12 uA
    3. 10 min run at 8 uA
    4. 10 min run at 3 uA
  3. Turn NPS Calo HV back on. Record NPS Calo Temperature Screenshot
2. Switch to positron running
  1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
    1. Ramp to 0
    2. Switch polarity
    3. use go\_magnets\_HMS\_current to set (positive) momentum value. Ramp all magnets to MOL, hold for 5 min, then ramp to setpoint
    4. Adjust final Dipole current in small steps to get field in NMR lock to relative precision 1.e-4
  2. Complete two cycles of positron running.
  3. LH2 Production
    1. **Four 30-min runs , ps4=0 12 uA** , CODA config coin\_sparse
  4. Dummy Target
    1. 30 min run at 12 uA, coin\_sparse, ps4=0
  5. LD2 Target
    1. **Six 30-min runs**, ps4=0, **8 uA** , CODA config coin\_sparse,
  6. Complete a second cycle as time permits by 7:00 am Wednesday

▪ **Wednesday 28-Feb-2024 day shift SAD**

- 07:00 (after beam off) Ramp HMS magnets to zero, and reverse polarity (back to electrons)
- After Heidi Fansler is done with work in Hall on HMS, Restore HMS to -2.416 GeV/c (electrons)
  - Adjust final Dipole current in small steps to get exact field in NMR lock to 0.661420(1) Tesla
- Resume LH2+Dummy+LD2 cycles
- Continue until 07:30 am Monday 4-March-2024

▪ **Thursday 29-Feb-2024 day shift** Moller ? Defer to next week since we are statistics limited?

- **Wednesday swing, Thursday Owl**, expect Hall B will perform Moller and reverse the Half-Wave-Plate
  - After HWP switch, **Run the:** "flipper" script ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_IHWP\\_Change\\_Procedure](https://hallcweb.jlab.org/wiki/index.php/Hall_C_IHWP_Change_Procedure))

▪ **07:30 am Monday 4-Mar-2024 Beam Off**

- Remove "Wings" from NPS Sweep. Prepare KinC\_x25\_4 (Verify HMS-SHMS separation)

▪

# Short Term Run-Plan

from HallCWiki

Last update: 22-Feb-24. Send comments and corrections to C. Hyde

A full updated Run Plan, Feb-May 2024 is available NPS\_Completion\_2024.pdf (modified 22-Feb-2024). 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 wiki 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 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](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>)
- **23-Feb-2024** . Start of KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

## 1. KinC\_x36\_6 Tuning

### 1. Target "Out-of-Beam"

1. Ask MCC to tune NPS Sweep and Correctors to sweep current 468 Amp,
  - **Ask MCC to report minimal and maximal acceptable corrector settings in range (0,0) to upstream=19Amp, Downstream=23Amp.**
  - Record screenshot of Sweep GUI when tuning done.

### 2. Luminosity/background scan at **Lowest MCC-acceptable corrector setting**

- Label CODA runs "Lumi-Scan"

#### 1. LH2 Target

- For EACH run, record screenshots of "NPS CAL Anode Current", "NPS CAL FADC SCALERS", "NPS VTP SCALERS", "HALL C SCALER DATA"
1. 10 min run 10 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  2. 10 min run 20 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  3. 10 min run 30 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate

#### 2. LD2 Target

- For EACH run, record screenshots of "NPS CAL Anode Current", "NPS CAL FADC SCALERS", "NPS VTP SCALERS", "HALL C SCALER DATA"
1. 10 min run 5 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  2. 10 min run 10 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  3. 10 min run 15 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate

### 3. Repeat Luminosity/background scan at **Highest MCC-acceptable corrector setting**

- Record screenshot of Sweep GUI when tuning done.
- Select desired corrector tune based on which provides lowest values in "NPS CAL Anode Current", "NPS VTP SCALERS", and/or hTRIG1 rate at fixed current.
- Select LH2 and LD2 production currents based on  $hTRIG1 \leq 2.4e6/sec$

### 4. If optimal corrector tune is non-zero then do this Optics study **Label CODA runs Optics**

#### 1. Sweep & Correctors ON, HMS Collimator **Sieve** Raster ON

- Lower beam currents to keep NPS Calo Anode current Max < 10 uA
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

5. Return HMS Collimator to **LARGE**

2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- Electron count rate in HMS ~ 200 Hz, so run with ps4=0
- Critical to adjust beam current to keep hTRIG1 <2.4e6 Hz and NPS Calo Anode current Max < 10 uA
- Need positron runs (HMS polarity reversed) with 10% of beam time (scheduled for Monday)
- **Keep careful watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc. - take snapshots of ROC windows, hlog entry, tag Ben**
  - As needed, stop and restart coda run. If this is not sufficient, reboot all NPS crates (see howto link above)

1. LH2 Production

1. **Eight 30-min runs** , ps4=0 , <sup>5</sup>30 uA (or as determined from Lumi-Scan, and hTRIG1 <2.4e6). CODA config coin\_sparse
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at <sup>3</sup>20 uA, coin\_sparse, ps4=0 <sup>3 mA</sup>
3. One 30-min run at <sup>1</sup>15 uA, coin\_sparse, ps4=0 <sup>2 mA</sup>
4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at <sup>3</sup>30 uA (or same as production), **coin** , ps4=<sup>9</sup>1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
6. First cycle only: One 20-min run at <sup>5</sup>20 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0
3. 20 min run at 10 uA, coin\_sparse, ps4=0: (First cycle only)

3. LD2 Target

1. **Sixteen 30-min runs**, ps4=0, <sup>2</sup>15 uA (or as determined from Lumi-Scan, and hTRIG1 <2.4e6) CODA config coin\_sparse,
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20 min run at 12 uA, coin\_sparse, ps4=0
3. One 30 min run at 8 uA, coin\_sparse, ps4=0
4. One 40-min run at 6 uA, coin\_sparse, ps4=0
5. One 15 min run at 15 uA (or same as production), **coin** , ps4=2 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
6. First cycle only: One 20-min run at 10 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

3. Repeat Full LH2+Dummy+LD2 cycle until Monday ~7:30 am

▪ **Monday 26-Feb-2024 day shift**

1. Positron run

1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
  1. Ramp to 0
  2. Switch polarity
  3. use go\_magnets to ramp all magnets to MOL, then setpoint
  4. Adjust final Dipole current in small steps to get exact field in NMR lock
2. Complete one cycle (24 hours?) of positron running. All ps factors same as above (positrons are electrons to the Cherenkov).

2. Switch back to electrons Tuesday morning.

▪ **Tuesday 27-Feb-2024 day shift**

- Reverse HMS polarity back to -2.416 GeV/c (electrons)
- Resume LH2+Dummy+LD2 cycles
- Continue until 07:30 am Monday 4-March-2024

▪ **Wednesday 28-Feb-2024 day shift** SAD

▪ **Thursday 29-Feb-2024 day shift** Moller



# Short Term Run-Plan

from HallCWiki

**Last update: 22-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available NPS\_Completion\_2024.pdf (modified 22-Feb-2024). 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 wiki 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 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](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 22-Feb-2024 \***
- Beam off 07:30 am. End of KinC\_x60\_4
  - Radcon Sweep 07:45. Controlled Access until Friday morning
  - Rotate HMS to 26.850 for KinC\_x36\_6 after Hall C Sweep
    - Ramp HMS to -2.416 GeV/c (electrons) = 0.66142 Tesla.
      1. Adjust final current in tiny steps to get this exact field
  - Rotate SHMS to 37.95 deg.
  - 08:30 Lock-out, Tag-out NPS Sweep (Dave Gaskell)

1. Move NPS Calorimeter to 6.0 m for maintenance
2. Techs remove Pb Shield from back of NPS Sweep Magnet
3. Refurbish NPS columns 24, 25
  1. Remove two columns PMT/Base
  2. Replace Bases with jumpered bases
  3. Reassemble and reinstall PMT/Base for Columns 24-25
4. Techs rotated SHMS to 23.801 deg (NPS to 7.500 deg) Pb curtain prevented movement to 23.7 deg, (shift of one crystal width @ 4m)
  - SHMS rotation controls are locked out
  - Forward segment of railing removed.

- **Friday 23-Feb-2024 Day Shift \***

1. Move Calorimeter back to 4.0 m
  - **10:00 am? 23-Feb-2024** . Start of KinC\_x36\_6
    - SHMS 23.80 deg NPS at 7.5 deg
      1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
    - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)
1. KinC\_x36\_6 Tuning
  1. Target "Out-of-Beam"
    1. Ask MCC to tune NPS Sweep and Correctors to sweep current 468 Amp,
      - **Ask MCC to report minimal and maximal acceptable corrector settings in range (0,0) to upstream=19Amp, Downstream=23Amp.**
      - Record screenshot of Sweep GUI when tuning done.
  2. Luminosity/background scan at **Lowest MCC-acceptable corrector setting**
    - Label CODA runs "Lumi-Scan"
  1. LH2 Target
    - For EACH run, record screenshots of "NPS CAL Anode Current", "NPS CAL FADC SCALERS", "NPS VTP SCALERS", "HALL C SCALER DATA"
    - 1. 10 min run 10 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
    - 2. 10 min run 20 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
    - 3. 10 min run 30 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
  2. LD2 Target
    - For EACH run, record screenshots of "NPS CAL Anode Current", "NPS CAL FADC SCALERS",

"NPS VTP SCALERS", "HALL C SCALER DATA"

1. 10 min run 5 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
2. 10 min run 10 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate
3. 10 min run 15 uA. CODA config = coin\_sparse. ps4=0, make a note on run sheet of hTRIG1 rate

3. Repeat Luminosity/background scan at **Highest MCC-acceptable corrector setting**

- Record screenshot of Sweep GUI when tuning done.
- Select desired corrector tune based on which provides lowest values in "NPS CAL Anode Current", "NPS VTP SCALERS", and/or hTRIG1 rate at fixed current.
- Select LH2 and LD2 production currents based on  $hTRIG1 \leq 2.4e6/sec$

4. If optimal corrector tune is non-zero then do this Optics study **Label CODA runs Optics**

1. Sweep & Correctors ON, HMS Collimator **Sieve** Raster ON
  - Lower beam currents to keep NPS Calo Anode current Max < 10 uA
  - 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

5. Return HMS Collimator to **LARGE**

2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- Electron count rate in HMS ~ 200 Hz, so run with ps4=0
- Critical to adjust beam current to keep hTRIG1 < 2.4e6 Hz and NPS Calo Anode current Max < 10 uA
- Need positron runs (HMS polarity reversed) with 10% of beam time (scheduled for Monday)

1. LH2 Production

1. **Four 1-hour runs, ps4=0**, 30 uA (or as determined from Lumi-Scan, and  $hTRIG1 < 2.4e6$ ). CODA config coin\_sparse
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 20 uA, coin\_sparse, ps4=0
3. One 30-min run at 15 uA, coin\_sparse, ps4=0
4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at 30 uA (or same as production), **coin**, ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
6. First cycle only: One 20-min run at 20 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

1. **Eight 1-hour runs, ps4=0, 15 uA** (or as determined from Lumi-Scan, and  $hTRIG1 < 2.4e6$ ) CODA config coin\_sparse,
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20 min run at 12 uA, coin\_sparse, ps4=0
3. One 30 min run at 8 uA, coin\_sparse, ps4=0
4. One 40-min run at 6 uA, coin\_sparse, ps4=0
5. One 15 min run at 15 uA (or same as production), **coin**, ps4=2 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
6. First cycle only: One 20-min run at 10 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

3. Repeat Full LH2+Dummy+LD2 cycle until Monday ~7:30 am

▪ **Monday 26-Feb-2024 day shift**

1. Positron run

1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
  1. Ramp to 0
  2. Switch polarity
  3. use go\_magnets to ramp all magnets to MOL, then setpoint
  4. Adjust final Dipole current in small steps to get exact field in NMR lock
2. Complete one cycle (24 hours?) of positron running. All ps factors same as above (positrons are electrons to the Cherenkov).

2. Switch back to electrons Tuesday morning.

▪ **Tuesday 27-Feb-2024 day shift**

- Reverse HMS polarity back to -2.416 GeV/c (electrons)
- Resume LH2+Dummy+LD2 cycles
- Continue until 07:30 am Monday 4-March-2024

wed STD Thurs Moller

8 x 30min RUNS

16 x 30min RUNS

20min 10uA (once)

0,00001/min

$$I_{HMS} = 739,956 \text{ "True"} = 739,068$$

$$B = \frac{0,6622150}{0,66142}$$

$$0,66158$$

$$154$$

$$151$$

$$146$$

144

0,6614200

# Short Term Run-Plan

From HallCWiki

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  - Table of corrector currents for different SHMS/NPS angles: [2] ([https://hallcweb.jlab.org/wiki/images/9/93/NPS\\_angles\\_currents.pdf](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 19-Feb-2024**
  - KinC\_x60\_4a & KinC\_x60\_4b Single-arm trigger ps4=0 (all other ps=-1, except as noted)
  - HMS
    - HMS momentum -5.038 GeV/c (electrons) **Adjust current on Dipole to get agreement on field set point to 1.e-5 (relative)**
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
    - HMS Collimator **LARGE**
  - SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF
- If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).
- Every morning ~10:00 am, reboot all 5 NPS crates** Follow this NPS DAQ how to ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_DAQ#NPS](https://hallcweb.jlab.org/wiki/index.php/Hall_C_DAQ#NPS)) Make an HCLOG entry.
- After each 50K replay, check HCLOG for possible entry "Scalers in run nnnn are bad!!!"**
  - See entry 4253001 (<https://logbooks.jlab.org/entry/4253001>)

1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a** . EDTM = 40 Hz. All ps=-1 except as noted.

1. LH2 Production

- Four** 1-hour runs, **ps4=0** , 40 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
- One 20-min run at 30 uA, coin\_sparse, ps4=0
- One 30-min run at 20 uA, coin\_sparse, ps4=0
- One 40-min run at 10 uA, coin\_sparse, ps4=0
- One 15-min run at 40 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

- 20 min run at 30 uA, coin\_sparse, ps4=0
- 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

- Eight** 1-hour runs, ps4=0, **20 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
- One 20 min run at 15 uA, coin\_sparse, ps4=0
- ~~One 30 min run at 12 uA, coin\_sparse, ps4=0~~
- One 40-min run at 8 uA, coin\_sparse, ps4=0
- One 15 min run at 20 uA (or same as production), **coin** , ps4=2
  - (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b** EDTM 40 Hz

1. LH2 Production

- Four** 1-hour runs, ps4=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
- One 20-min run at 30 uA, coin\_sparse, ps4=0
- ~~One 30 min run at 20 uA, coin\_sparse, ps4=0~~
- One 40-min run at 10 uA, coin\_sparse, ps4=0
- One 15-min run at 40 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep

3K0A/B

1000 psec

0.2/20

swing

Fun

Two

CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

1. ~~Eight~~ <sup>Four</sup> 1-hour runs, ps4=0, **20 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec

1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens

2. One 20 min run at 15 uA, coin\_sparse, ps4=0

~~3. One 30 min run at 12 uA, coin\_sparse, ps4=0~~

4. One 40-min run at 8 uA, coin\_sparse, ps4=0

5. One 15 min run at 20 uA (or same as production), **coin**, ps4=2

▪ ps4 prescaled as needed to keep CODA Data rate less than 130 MB/s)

3. Repeat cycles of KinC\_x60\_4a & KinC\_x60\_4b until Friday 23-Feb-2024 Day Shift

4. **23-Feb-2024 Day Shift:**

1. Beam Off 07:30. Call for Sweep: Controlled Access until noon-ish

2. Rotate HMS to 26.850 for KinC\_x36\_6 before Hall C Sweep

▪ Ramp HMS to -2.416 GeV/c (electrons) = 0.66142 Tesla.

▪ Adjust final current in tiny steps to get this exact field

3. Rotate SHMS to 38.00 (or at least 37.95 deg) before Hall C Sweep.

4. 08:30 Lock-out, Tag-out NPS Sweep (Joe Beaufait)

1. Techs remove Pb Shield from back of NPS Sweep Magnet

2. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg),

▪ **Noon 23-Feb-2024** . Start of KinC\_x36\_6

▪ SHMS 23.70 deg NPS at 7.4 deg

1. **Do NOT rotate SHMS without Tech Support and Spotters in Hall!**

▪ HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

1. KinC\_x36\_6 Tuning

1. Ask MCC for NPS Sweep ON (468 Amp), tune Correctors starting from upstream=19Amp, Downstream=23Amp.

▪ 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

▪ Lower beam currents to keep NPS Calo Anode current Max < 10 uA

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

3. Return HMS Collimator to **LARGE**

2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

▪ Electron count rate in HMS ~ 200 Hz, so run with ps4=0

▪ Critical to adjust beam current to keep hTRIG1 < 2.4e6 Hz and NPS Calo Anode current Max < 10 uA

1. LH2 Production

1. **Four** 1-hour runs, **ps4=0** , 30 uA CODA config coin\_sparse

▪ First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens

2. One 20-min run at 20 uA, coin\_sparse, ps4=0

3. One 30-min run at 15 uA, coin\_sparse, ps4=0

4. One 40-min run at 10 uA, coin\_sparse, ps4=0

5. One 15-min run at 30 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0

2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

1. **Eight** 1-hour runs, ps4=0, **15 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec

▪ First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens

2. One 20 min run at 12 uA, coin\_sparse, ps4=0

3. One 30 min run at 8 uA, coin\_sparse, ps4=0

4. One 40-min run at 6 uA, coin\_sparse, ps4=0

5. One 15 min run at 15 uA (or same as production), **coin** , ps4=2

▪ (prescaled as needed to keep CODA Data rate less than 130 MB/s)

22-Feb  
7:30am  
Beam off

# Short Term Run-Plan

From HallCWiki

**Last update: 19-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available NPS\_Completion\_2024.pdf. 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 wiki 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 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](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 19-Feb-2024**
  - KinC\_x60\_4a & KinC\_x60\_4b Single-arm trigger ps4=0 (all other ps=-1, except as noted)
  - HMS
    - HMS momentum -5.038 GeV/c (electrons) **Adjust current on Dipole to get agreement on field set point to 1.e-5 (relative)**
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
    - HMS Collimator **LARGE**
  - SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF
- **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).
- **Every morning ~10:00 am, reboot all 5 NPS crates** Follow this NPS DAQ how to ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_DAQ#NPS](https://hallcweb.jlab.org/wiki/index.php/Hall_C_DAQ#NPS)) Make an HCLOG entry.
- **After each 50K replay, check HCLOG for possible entry "Scalers in run nnnn are bad!!!"**
  - See entry 4253001 (<https://logbooks.jlab.org/entry/4253001>)

1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a** . EDTM = 40 Hz. All ps=-1 except as noted.

1. LH2 Production

1. **Four** 1-hour runs, **ps4=0** , 40 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 30 uA, coin\_sparse, ps4=0
3. One 30-min run at 20 uA, coin\_sparse, ps4=0
4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at 40 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

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

2. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b** EDTM 40 Hz

1. LH2 Production

- Two*
1. ~~Four~~ 1-hour runs, ps4=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
    - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  2. One 20-min run at 30 uA, coin\_sparse, ps4=0
  3. One 30-min run at 20 uA, coin\_sparse, ps4=0
  4. One 40-min run at 10 uA, coin\_sparse, ps4=0
  5. One 15-min run at 40 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep

CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

*Four* 1. ~~Eight~~ 1-hour runs, ps4=0, **20 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec

1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20 min run at 15 uA, coin\_sparse, ps4=0
- ~~3. One 30 min run at 12 uA, coin\_sparse, ps4=0~~
4. One 40-min run at 8 uA, coin\_sparse, ps4=0
5. One 15 min run at 20 uA (or same as production), **coin**, ps4=2

- ps4 prescaled as needed to keep CODA Data rate less than 130 MB/s)

3. Repeat cycles of KinC\_x60\_4a & KinC\_x60\_4b until Friday 23-Feb-2024 Day Shift

4. **23-Feb-2024 Day Shift:**

1. Beam Off 07:30. Call for Sweep: Controlled Access until noon-ish
2. Rotate HMS to 26.850 for KinC\_x36\_6 before Hall C Sweep
  - Ramp HMS to -2.416 GeV/c (electrons) = 0.66142 Tesla.
  - Adjust final current in tiny steps to get this exact field
3. Rotate SHMS to 38.00 (or at least 37.95 deg) before Hall C Sweep.
4. 08:30 Lock-out, Tag-out NPS Sweep (Joe Beaufait)
  1. Techs remove Pb Shield from back of NPS Sweep Magnet
  2. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg).

▪ **Noon 23-Feb-2024** . Start of KinC\_x36\_6

- SHMS 23.70 deg NPS at 7.4 deg
  1. **Do NOT rotate SHMS without Tech Support and Spotters in Hall!**
- HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

1. KinC\_x36\_6 Tuning

1. Ask MCC for NPS Sweep ON (468 Amp), tune Correctors starting from upstream=19Amp, Downstream=23Amp.
  - 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
  - Lower beam currents to keep NPS Calo Anode current Max < 10 uA
  - 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

3. Return HMS Collimator to **LARGE**

2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- Electron count rate in HMS ~ 200 Hz, so run with ps4=0
- Critical to adjust beam current to keep hTRIG1 < 2.4e6 Hz and NPS Calo Anode current Max < 10 uA

1. LH2 Production

1. **Four** 1-hour runs, **ps4=0** , 30 uA CODA config coin\_sparse
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 20 uA, coin\_sparse, ps4=0
3. One 30-min run at 15 uA, coin\_sparse, ps4=0
4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at 30 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

1. **Eight** 1-hour runs, ps4=0, **15 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec

- First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20 min run at 12 uA, coin\_sparse, ps4=0
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  4. One 40-min run at 6 uA, coin\_sparse, ps4=0
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- Online NPS database of run: <https://hallcweb.jlab.org/rcdb> (<https://hallcweb.jlab.org/rcdb>)
- **Friday, Saturday, Sunday 16-18 Feb 2024**
  - Calorimeter moved to 9.5 m
  - Replacement of Bases on NPS calorimeter columns 20, 21, 22, 23
- **Monday 19-Feb-2024**
  - Owl Shift Monday: Elastic Calibrations: | Elastic Kinematics (<https://logbooks.jlab.org/entry/4253182>)
    - HMS (already set Friday) P = +4.060 GeV/c (protons)
    - HMS theta = 29.980 deg
    - EDTM = 4Hz, All ps=-1 except as noted. Total hTRIG6 event rate expected ~17 Hz

1. SHMS theta = 31.100 deg (NPS 14.800) 5
  1. 1-hr run LH2 40 uA. CODA config **coin\_sparse** Label runs in CODA "Elastic Calib", ps~~4~~=0
    - expect calorimeter to look like | [hclg/4253182](https://logbooks.jlab.org/entry/4253182) (<https://logbooks.jlab.org/entry/4253182>) with columns 19-29 illuminated (0.08m < x < 0.3m)
2. SHMS theta = 32.185 deg (NPS 15.885 deg) 5
  1. 1-hr run LH2 40 uA. CODA config **coin\_sparse** Label runs in CODA "Elastic Calib", ps~~4~~=0
3. SHMS theta = 33.390 deg (NPS 17.090 deg)
  1. 1-hr run LH2 40 uA. CODA config **coin\_sparse** Label runs in CODA "Elastic Calib", ps~~4~~=0
4. Cycle again through the three angles. Priority is smallest angle, then middle angle. lower 5  
priority is largest angle
5. ~~Monday DAY shift 19-Feb-2024:~~ *Sunday Swing shifts*
  1. Move Calorimeter back to 4.0 m
  2. Restore HMS to KinC\_x60\_4 setting (below)
  3. Resume KinC\_x60\_4a data-taking (below) at 1.3.2 (LD2 target at 15 uA)

- **Feb 9, 2024: KinC\_x60\_4a & KinC\_x60\_4b Switch to single-arm trigger ps4=0 (low HMS rates)**
  - HMS
    - HMS momentum -5.038 GeV/c (electrons)
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
    - HMS Collimator **LARGE**
  - SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF
- **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).
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1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a** . EDTM = 40 Hz. All ps=-1 except as noted.
  1. LH2 Production
    1. **Four** 1-hour runs, **ps4=0** , 40 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
      - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
    2. One 20-min run at 30 uA, coin\_sparse, ps4=0
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02/14/2024 swing + 2. One 20 min run at 15 uA, coin\_sparse, ps4=0

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# Short Term Run-Plan

krada

private

start coin

13,000  
5,000  
15,000  
13,000

from HallCWiki

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  - 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](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>)
- **Feb 9, 2024: KinC\_x60\_4a & KinC\_x60\_4b Switch to single-arm trigger ps4=0 (low HMS rates)**
  - HMS
    - HMS momentum -5.038 GeV/c (electrons)
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
    - HMS Collimator **LARGE**
  - SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF
- **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).
- **Every morning ~10:00 am, reboot all 5 NPS crates** Follow this NPS DAQ how to ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_DAQ#NPS](https://hallcweb.jlab.org/wiki/index.php/Hall_C_DAQ#NPS)).

1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a**. EDTM = 40 Hz. All ps=-1 except as noted.
  1. LH2 Production
    1. **Four** 1-hour runs, **ps4=0**, 40 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
      - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
    2. One 20-min run at 30 uA, coin\_sparse, ps4=0
    3. One 30-min run at 20 uA, coin\_sparse, ps4=0
    4. One 40-min run at 10 uA, coin\_sparse, ps4=0
    5. One 15-min run at 40 uA (or same as production), **coin**, ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  2. Dummy Target
    1. 20 min run at 30 uA, coin\_sparse, ps4=0
    2. 20 min run at 20 uA, coin\_sparse, ps4=0
  3. LD2 Target
    1. **Eight** 1-hour runs, ps4=0, **20 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec
      - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
    2. One 20 min run at 15 uA, coin\_sparse, ps4=0
    3. One 30 min run at 12 uA, coin\_sparse, ps4=0
    4. One 40-min run at 8 uA, coin\_sparse, ps4=0
    5. One 15 min run at 20 uA (or same as production), **coin**, ps4=2
      - (prescaled as needed to keep CODA Data rate less than 130 MB/s)

16 Feb 27

2. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b** EDTM 40 Hz

1. LH2 Production

1. **Four** 1-hour runs, ps4=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 30 uA, coin\_sparse, ps4=0
3. One 30-min run at 20 uA, coin\_sparse, ps4=0
4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at 40 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

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

3. Repeat cycle of KinC\_x60\_4a & KinC\_x60\_4b again and again...until 23-Feb-2024 Day Shift

1. Tuesday 14-Feb-2024 Hall B pass change, followed by Moller (Thurs)
2. **14-Feb-2024 Day Shift:** Maintenance Day
  1. When Beam goes off (~8:00 am) rotate SHMS to 38.00 deg (or at least 37.95 deg) before Hall C Sweep.
  2. NPS mainenance work,
    1. Move Calo to 6.0 m
    2. Replace PMT-Base assembly on Crystal (20,20).
    3. Replace multiplexor interface card on Calo temperature monitors
    4. Move Calo back to 4.0 m
  3. Restore SHMS to previous setting (KinC\_x60\_4a or KinC\_x60\_4b)

3. **Friday 16-Feb-2024 Day Shift through Monday 19-Feb-2024 Owl Shift** Calorimeter repair work

1. Ask for Beam off (~7:30 am) and sweep for Controlled Access
  - Rotate SHMS to 38.00 deg (or at least 37.95 deg) before Hall C Sweep.
2. Move Calorimeter to 6.0 m (requires Techs and crane)
3. Friday: Remove PMT-Base assemblies of columns 20-23
4. As each column is removed, ask for survey to bring columns to RadControl area in 2nd floor of Counting House
5. Reassemble with new (jumpered) bases
6. Saturday: Replace two columns in Calorimeter
7. Sunday: Replace two columns in Calorimeter
  - Restore HV and chiller to calorimeter
8. Monday 08:00: Move NPS back to 4.00 m
  - Restore KinC\_x60\_a or \_b running conditions

4. **23-Feb-2024 Day Shift:**

1. Rotate HMS to 26.850 for KinC\_x36\_6 before Hall C Sweep
2. Rotate SHMS to 38.00 (or at least 37.95 deg) before Hall C Sweep.
3. Techs remove Pb Shield from back of NPS Sweep Magnet
4. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg),

4. Swing Shift 23-Feb-2024 Start of KinC\_x36\_6, NPS at 7.4 deg

1. Electron count rate in HMS ~ 200 Hz, so run with ps4=0

▪

*16 Feb  
00:40  
and so on @ 19:15*

# Short Term Run-Plan

From HallCWiki

**Last update: 13-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available NPS\_Completion\_2024.pdf . 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 wiki 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 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](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>)
- **Feb 9, 2024: KinC\_x60\_4a & KinC\_x60\_4b Switch to single-arm trigger ps4=0 (low HMS rates)**
  - HMS
    - HMS momentum -5.038 GeV/c (electrons)
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
    - HMS Collimator **LARGE**
  - SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF
- **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).
- **Every morning ~10:00 am, reboot all 5 NPS crates** Follow this NPS DAQ how to ([https://hallcweb.jlab.org/wiki/index.php/Hall\\_C\\_Daq#NPS](https://hallcweb.jlab.org/wiki/index.php/Hall_C_Daq#NPS)).

1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a** . EDTM = 40 Hz. All ps=-1 except as noted.

## 1. LH2 Production

1. **Four** 1-hour runs, **ps4=0** , 40 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 30 uA, coin\_sparse, ps4=0
3. One 30-min run at 20 uA, coin\_sparse, ps4=0
4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at 40 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

## 2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

## 3. LD2 Target

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

Red > Config, = 0 (Red - (A coin sig)) = 18 = 0

01/13/24 day shift

2. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b** EDTM 40 Hz

1. LH2 Production

- 1. **Four** 1-hour runs, ps4=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
- 2. One 20-min run at 30 uA, coin\_sparse, ps4=0
- 3. One 30-min run at 20 uA, coin\_sparse, ps4=0
- 4. One 40-min run at 10 uA, coin\_sparse, ps4=0
- 5. One 15-min run at 40 uA (or same as production), **coin**, ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

- 1. 20 min run at 30 uA, coin\_sparse, ps4=0
- 2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

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

7/14/24 }  
completed }  
4,5 of 8 } →

3. Repeat cycle of KinC\_x60\_4a & KinC\_x60\_4b again and again...until 23-Feb-2024 Day Shift

1. Tuesday 14-Feb-2024 Hall B pass change, followed by Moller (Thurs)

2. **14-Feb-2024 Day Shift:** Maintenance Day

- 1. When Beam goes off (~8:00 am) rotate SHMS to 38.00 deg (or at least 37.95 deg) before Hall C Sweep.
- 2. NPS mainenance work,
  - 1. Move Calo to 6.0 m
  - 2. Replace PMT-Base assembly on Crystal (20,20).
  - 3. Replace multiplexor interface card on Calo temperature monitors
  - 4. Move Calo back to 4.0 m
- 3. Restore SHMS to previous setting (KinC\_x60\_4a or KinC\_x60\_4b)

3. **Friday 16-Feb-2024 Day Shift through Monday 19-Feb-2024 Owl Shift** Calorimeter repair work

- 1. Ask for Beam off (~7:30 am) and sweep for Controlled Access
  - Rotate SHMS to 38.00 deg (or at least 37.95 deg) before Hall C Sweep.
- 2. Move Calorimeter to 6.0 m (requires Techs and crane)
- 3. Friday: Remove PMT-Base assemblies of columns 20-23
- 4. As each column is removed, ask for survey to bring columns to RadControl area in 2nd floor of Counting House
- 5. Reassemble with new (jumpered) bases
- 6. Saturday: Replace two columns in Calorimeter
- 7. Sunday: Replace two columns in Calorimeter
  - Restore HV and chiller to calorimeter
- 8. Monday 08:00: Move NPS back to 4.00 m
  - Restore KinC\_x60\_a or \_b running conditions

4. **23-Feb-2024 Day Shift:**

- 1. Rotate HMS to 26.850 for KinC\_x36\_6 before Hall C Sweep
- 2. Rotate SHMS to 38.00 (or at least 37.95 deg) before Hall C Sweep.
- 3. Techs remove Pb Shield from back of NPS Sweep Magnet
- 4. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg),

4. Swing Shift 23-Feb-2024 Start of KinC\_x36\_6, NPS at 7.4 deg

- 1. Electron count rate in HMS ~ 200 Hz, so run with ps4=0

▪

# Short Term Run-Plan

From HallCWiki

**Last update: 12:00 09-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available [NPS\\_Completion\\_2024.pdf](#). 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 wiki 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 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](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>)

- **Feb 9, 2024: KinC\_x60\_4a & KinC\_x60\_4b Switch to single-arm trigger ps4=0 (low HMS rates)**

- HMS
  - HMS momentum -5.038 GeV/c (electrons)
  - HMS Angle 19.350 deg. Record vernier value to 3-decimals
  - HMS Collimator **LARGE**
- SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF
- **If beam projected OFF for > 1 hour, Do LED runs** Follow this howto ([https://hallcweb.jlab.org/wiki/index.php/Taking\\_LED\\_Data](https://hallcweb.jlab.org/wiki/index.php/Taking_LED_Data)).

1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a**. EDTM = 40 Hz. All ps=-1 except as noted.

1. LH2 Production

1. **Four** 1-hour runs, **ps4=0**, 40 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 30 uA, coin\_sparse, ps4=0
3. One 30-min run at 20 uA, coin\_sparse, ps4=0
4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at 40 uA (or same as production), **coin**, ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

2. Dummy Target

1. 20 min run at 30 uA, coin\_sparse, ps4=0
2. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

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

1. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b** EDTM 40 Hz

1. LH2 Production

1. **Four** 1-hour runs, ps4=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 30 uA, coin\_sparse, ps4=0
3. One 30-min run at 20 uA, coin\_sparse, ps4=0

4. One 40-min run at 10 uA, coin\_sparse, ps4=0
5. One 15-min run at 40 uA (or same as production), **coin** , ps4=1 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Dummy Target
  1. 20 min run at 30 uA, coin\_sparse, ps4=0
  2. 20 min run at 20 uA, coin\_sparse, ps4=0
3. LD2 Target
  1. **Eight** 1-hour runs, ps4=0, **20 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec
    1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  2. One 20 min run at 15 uA, coin\_sparse, ps4=0
  3. One 30 min run at 12 uA, coin\_sparse, ps4=0
  4. One 40-min run at 8 uA, coin\_sparse, ps4=0
  5. One 15 min run at 20 uA (or same as production), **coin** , ps4=2 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Repeat cycle of KinC\_x60\_4a & KinC\_x60\_4b again and again...until 25-Feb-2024 Day Shift
  1. Tuesday 14-Feb-2024 Hall B pass change, followed by Moller (Tues or Thurs)
  2. **23-Feb-2024 Day Shift:**
    1. Techs remove Pb Shield from back of NPS Sweep Magnet
    2. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg), then rotate back for completion of KinC\_x60\_4
3. 25-Feb-2024 Start of KinC\_x36\_6, NPS at 7.4 deg

■

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

■ **Feb 9, 2024 == KinC\_x60\_4a & KinC\_x60\_4b**

- HMS
  - HMS momentum -5.038 GeV/c (electrons)
  - HMS Angle 19.350 deg. Record vernier value to 3-decimals
  - HMS Collimator **LARGE**
- SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF

■

1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a** . EDTM = 40 Hz
  1. LH2 Production
    1. **Four** 1-hour runs, ps6=0, 35 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s and hTrig1<2MHz
    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 35 uA (or same as production), **coin** , ps6=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  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. 20 min run at 20 uA, coin\_sparse, ps4=0
  3. LD2 Target
    1. **Twelve** 1-hour runs, ps6=0, **12 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec and hTrig1<2MHz
      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 6 uA, coin\_sparse, ps6=0
    4. One 20-min run at 6 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)



1. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b EDTM 40 Hz**
  1. LH2 Production
    1. **Four** 1-hour runs, ps6=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s and hTrig1<2MHz
    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)
  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. 20 min run at 20 uA, coin\_sparse, ps4=0
  3. LD2 Target
    1. **Eight** 1-hour runs, ps6=0, **20 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec and hTrig1<2MHz
      1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
    2. One 40 min run at 15 uA, coin\_sparse, ps6=0
    3. One 40 min run at 10 uA, coin\_sparse, ps6=0
    4. One 20-min run at 10 uA, coin\_sparse, ps4=0
    5. One 15 min run at 20 uA (or same as production), **coin** , ps6=3 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Repeat cycle of KinC\_x60\_4a & KinC\_x60\_4b again and again...until 25-Feb-2024 Day Shift
  1. Tuesday 14-Feb-2024 Hall B pass change, followed by Moller (Tues or Thurs)
  2. **23-Feb-2024 Day Shift:**
    1. Techs remove Pb Shield from back of NPS Sweep Magnet
    2. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg), then rotate back for completion of KinC\_x60\_4
3. 25-Feb-2024 Start of KinC\_x36\_6, NPS at 7.4 deg

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

- **Swing Shift Feb 7, 2024 ==> KinC\_x60\_4a & KinC\_x60\_4b**
- Start with KinC\_x60\_4a
  - Calorimeter at 4.00 m
  - Verify angle encoders on HMS & SHMS agree with cameras before moving!
  - HMS
    - HMS momentum -5.038 GeV/c (electrons)
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
  - SHMS:
    - SHMS Angle 30.375 deg (NPS 14.075 deg). Record vernier value to 3-decimals
  - Take screenshots of spectrometer vernier cameras and motion gui when done
  - EDTM 40 Hz
  - Re-download coin\_sparse config file to CODA for new thresholds: 1600, 800
- 1. KinC\_x60\_4a Tuning
  1. Ask MCC for NPS Sweep ON (468 Amp), 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
  3. Return HMS Collimator to **LARGE**
- 2. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a**
  1. LH2 Production
    1. **Two** 1 hour runs, ps6=0, 35 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s and hTrig1<2MHz

( $P_1, P_2, E$ )

[ $m^2, p^2$ ]

$m^2 - c^2 - p^2$

# Short Term Run-Plan

From HallCWiki

**Last update: 9-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available NPS\_Completion\_2024.pdf . 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 wiki 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 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](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>)

- **Feb 9, 2024 == KinC\_x60\_4a & KinC\_x60\_4b**

- HMS
  - HMS momentum -5.038 GeV/c (electrons)
  - HMS Angle 19.350 deg. Record vernier value to 3-decimals
  - HMS Collimator **LARGE**
- SHMS: NPS Sweep Magnet on 468 Amp. Correctors OFF

1. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a** . EDTM = 40 Hz

1. LH2 Production

1. **Four** 1-hour runs, ps6=0, 35 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s and hTrig1 < 2MHz
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 35 uA (or same as production), **coin** , ps6=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

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. 20 min run at 20 uA, coin\_sparse, ps4=0

3. LD2 Target

1. **Twelve** 1-hour runs, ps6=0, **12 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec and hTrig1 < 2MHz
  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 6 uA, coin\_sparse, ps6=0
4. One 20-min run at 6 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)

1. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b** EDTM 40 Hz
  1. LH2 Production
    1. **Four** 1-hour runs, ps6=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s and hTrig1 < 2MHz
    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)
  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. 20 min run at 20 uA, coin\_sparse, ps4=0
  3. LD2 Target
    1. **Eight** 1-hour runs, ps6=0, **20 uA** CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec and hTrig1 < 2MHz
      1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalars, Calo screens
    2. One 40 min run at 15 uA, coin\_sparse, ps6=0
    3. One 40 min run at 10 uA, coin\_sparse, ps6=0
    4. One 20-min run at 10 uA, coin\_sparse, ps4=0
    5. One 15 min run at 20 uA (or same as production), **coin**, ps6=3 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Repeat cycle of KinC\_x60\_4a & KinC\_x60\_4b again and again...until 25-Feb-2024 Day Shift
  1. Tuesday 14-Feb-2024 Hall B pass change, followed by Moller (Tues or Thurs)
  2. **23-Feb-2024 Day Shift:**
    1. Techs remove Pb Shield from back of NPS Sweep Magnet
    2. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg), then rotate back for completion of KinC\_x60\_4
  3. 25-Feb-2024 Start of KinC\_x36\_6, NPS at 7.4 deg

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

- **Swing Shift Feb 7, 2024 ==> KinC\_x60\_4a & KinC\_x60\_4b**
- Start with KinC\_x60\_4a
  - Calorimeter at 4.00 m
  - Verify angle encoders on HMS & SHMS agree with cameras before moving!
  - HMS
    - HMS momentum -5.038 GeV/c (electrons)
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
  - SHMS:
    - SHMS Angle 30.375 deg (NPS 14.075 deg). Record vernier value to 3-decimals
  - Take screenshots of spectrometer vernier cameras and motion gui when done
  - EDTM 40 Hz
  - Re-download coin\_sparse config file to CODA for new thresholds: 1600, 800
- 1. KinC\_x60\_4a Tuning
  1. Ask MCC for NPS Sweep ON (468 Amp), 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

# Short Term Run-Plan

From HallCWiki

**Last update: 7-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available here for your information. 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 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](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>)
- **Swing Shift Feb 7, 2024 ==> KinC\_x60\_4a & KinC\_x60\_4b**
- Start with KinC\_x60\_4a
  - Calorimeter at 4.00 m
  - Verify angle encoders on HMS & SHMS agree with cameras before moving!
  - HMS
    - HMS momentum -5.038 GeV/c (electrons)
    - HMS Angle 19.350 deg. Record vernier value to 3-decimals
  - SHMS:
    - SHMS Angle 30.375 deg (NPS 14.075 deg). Record vernier value to 3-decimals
  - Take screenshots of spectrometer vernier cameras and motion gui when done
  - EDTM 40 Hz
  - Re-download coin\_sparse config file to CODA for new thresholds: 1600, 800

## 1. KinC\_x60\_4a Tuning

1. Ask MCC for NPS Sweep ON (468 Amp), 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
3. Return HMS Collimator to **LARGE**

## 2. KinC\_x60\_4a Production SHMS = 30.375 deg. **Label CODA runs KinC\_x60\_4a**

1. LH2 Production <sup>35mA</sup>
  - 2) 1. **Two** 1 hour runs, ps6=0, 40 uA CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s and hTrig1 < 2MHz
  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
    1. First cycle only, one 20-min run at 20 uA, coin\_sparse, ps3=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) <sub>35mA</sub> <sup>ps6=0</sup>
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

- 1h, 15uA
- ✓1. **Five** 1-hour runs, ps6=0, ~~15~~<sup>12</sup> uA CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec and hTrig1 < 2MHz
    1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  - ✓2. One 40 min run at ~~12~~<sup>8</sup> uA, coin\_sparse, ps6=0  $8 \mu A$
  - ✓3. One 40 min run at ~~8~~<sup>6</sup> uA, coin\_sparse, ps6=0  $6 \mu A$
  - ✓4. One 20-min run at ~~8~~<sup>6</sup> uA, coin\_sparse, ps4=0  $6 \mu A$ 
    1. First cycle only, one 20-min run at ~~8~~<sup>6</sup> uA, coin\_sparse, ps3=0  $6 \mu A$
  - ✓5. One 15 min run at ~~15~~<sup>12</sup> uA (or same as production), **coin**, ps6=3 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

### 3. KinC\_x60\_4b Tuning

1. Keep HMS at -5.038 GeV/c. Angle 19.350 deg.
2. SHMS: verify angle encoder agrees with camera before moving!
  1. SHMS rotate to 33.810 deg (NPS 17.510). Record vernier from camera to 3 digits and take screenshot.
3. Ask MCC for NPS Sweep ON (468 Amp), tune Correctors starting from (0,0)
  1. Record screenshot of Sweep GUI when tuning done.
4. 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

#### 5. Return HMS Collimator to **LARGE**

### 4. KinC\_x60\_4b Production SHMS = 33.810 deg. **Label CODA runs KinC\_x60\_4b** EDTM 40 Hz

#### 1. LH2 Production

- ✓1. **Two** 1 hour runs, ps6=0, 40 uA. CODA config coin\_sparse, Lower current as necessary to keep CODA Data Rate < 130 MB/s and hTrig1 < 2MHz
- ✓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
  1. First cycle only, one 20-min run at 20 uA, coin\_sparse, ps3=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)

#### 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

- 43 21
1. **Four** 1-hour runs, ps6=0, **20** uA CODA config coin\_sparse, lower current as needed to keep Data Rate < 130 MBy/sec and hTrig1 < 2MHz
    1. First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
    2. One 40 min run at 15 uA, coin\_sparse, ps6=0
    - ✓3. One 40 min run at 10 uA, coin\_sparse, ps6=0
    - ✓4. One 20-min run at 10 uA, coin\_sparse, ps4=0
      1. First cycle only, one 20-min run at 10 uA, coin\_sparse, ps3=0
    - ✓5. One 15 min run at 20 uA (or same as production), **coin**, ps6=3 (prescaled as needed to keep CODA Data rate less than 130 MB/s)

### 5. Repeat cycle of KinC\_x60\_4a & KinC\_x60\_4b again and again...undit 25-Feb-2024 Day Shift

#### 1. **23-Feb-2024 Day Shift:**

1. Techs remove Pb Shield from back of NPS Sweep Magnet
2. Techs survey rotation of SHMS to 23.70 deg (NPS to 7.40 deg), then rotate back for completion of KinC\_x60\_4

### 6. 25-Feb-2024 Start of KinC\_x36\_6, NPS at 7.4 deg

# Short Term Run-Plan

From HallCWiki

**Last update: 15:15 23-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available [NPS\\_Completion\\_2024.pdf](#) (modified 22-Feb-2024). 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 wiki 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 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](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>)
- **23-Feb-2024** . Start of KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

## 1. KinC\_x36\_6 Tuning

### 1. Tuning NPS Sweep & Correctors

1. With NPS Sweep at 468 Amp, transport of beam to dump is fine with correctors off,
2. Transport to dump is fine for any proportional setting of (up,down) correctors up to (19,23).
3. NPS Calo Anode currents were 10% lower on LH2 with correctors off relative to on, so we will proceed with correctors off

### 2. Luminosity/background scans with correctors off were semi catastrophic. CODA runs "Lumi-Scan"

- Final production settings
  1. Turn off HV to column 0 & 1
  2. LH2 run at 5 uA, max anode current (column 2) is 7 uA. hTRIG1 >2e6 at present threshold values
  3. LD2 run at 3 uA, max anode current column 2 is 7 uA.
- Label CODA runs "Lumi-Scan"

### 3. Took reference LD2 run 4588, 30 min at 2 uA

## 2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- HMS Collimator LARGE
- Critical to adjust beam current to keep NPS Calo Anode current Max < 10 uA
- Need positron runs (HMS polarity reversed) with 10% of beam time (scheduled for Monday)
- **Keep carefull watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**
  - As needed, stop and restart coda run. If this is not sufficient, reboot all NPS crates (see howto link above)

### 1. LH2 Production

1. **Eight 30-min runs , ps4=0 5 uA** , CODA config coin\_sparse
  - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
2. One 20-min run at 3 uA, coin\_sparse, ps4=0
3. One 30-min run at 2 uA, coin\_sparse, ps4=0

4. One 15-min run at 5 uA (or same as production), **coin** , ps4=0
5. First cycle only: One 20-min run at 5 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Dummy Target
  1. 30 min run at 5 uA, coin\_sparse, ps4=0
  2. 20 min run at 3 uA, coin\_sparse, ps4=0
  3. 20 min run at 2 uA, coin\_sparse, ps4=0: (First cycle only)
3. LD2 Target
  1. **Sixteen 30-min runs**, ps4=0, **3 uA** CODA config coin\_sparse,
    - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  2. One 20 min run at 1 uA, coin\_sparse, ps4=0 (Skip if MCC cannot control 1uA)
  3. One 20 min run at 2 uA, coin\_sparse, ps4=0
  4. One 15 min run at 3 uA (or same as production), **coin** , ps4=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
  5. First cycle only: One 20-min run at 3 uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
3. Repeat Full LH2+Dummy+LD2 cycle until Monday ~noon

▪ **Monday 26-Feb-2024 day shift**

1. Positron run
  1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
    1. Ramp to 0
    2. Switch polarity
    3. use go\_magnets to ramp all magnets to MOL, then setpoint
    4. Adjust final Dipole current in small steps to get exact field in NMR lock
  2. Complete one cycle (18 hours?) of positron running.
  3. LH2 Production
    1. **Eight 30-min runs** , ps4=0 **5 uA** , CODA config coin\_sparse
  4. Dummy Target
    1. 30 min run at 5 uA, coin\_sparse, ps4=0
    2. 30 min run at 2 uA, coin\_sparse, ps4=0
  5. LD2 Target
    1. **Sixteen 30-min runs**, ps4=0, **2 uA** , CODA config coin\_sparse,
2. Switch back to electrons Tuesday morning.

▪ **Tuesday 27-Feb-2024 day shift**

- Reverse HMS polarity back to -2.416 GeV/c (electrons)
- Resume LH2+Dummy+LD2 cycles
- Continue until 07:30 am Monday 4-March-2024

▪ **Wednesday 28-Feb-2024 day shift** SAD

▪ **Thursday 29-Feb-2024 day shift** Moller

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

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- **23-Feb-2024** . Start of KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)



# Short Term Run-Plan

From HallCWiki

**Last update: 17:15 24-Feb-24. Send comments and corrections to C. Hyde**

A full updated Run Plan, Feb-May 2024 is available [NPS\\_Completion\\_2024.pdf](#) (modified 22-Feb-2024). 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 wiki 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 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](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>)
- **23-Feb-2024** . Start of KinC\_x36\_6
  - SHMS 23.80 deg NPS at 7.5 deg
    1. **CANNOT rotate SHMS without Steve Lassiter & Tech Support in Hall!**
  - HMS angle = 26.850 deg, Momentum = -2.416 GeV/c (Field = 0.66142 Tesla)

## 1. KinC\_x36\_6 Tuning

### 1. Tuning NPS Sweep & Correctors

1. With NPS Sweep at 468 Amp, transport of beam to dump is fine with correctors off,
2. Transport to dump is fine for any proportional setting of (up,down) correctors up to (19,23).
3. NPS Calo Anode currents were 10% lower on LH2 with correctors off relative to on, so we will proceed with correctors off

### 2. Luminosity/background scans with correctors off were semi catastrophic. CODA runs "Lumi-Scan"

- Final production settings
  1. Turn off HV to column 0 & 1
  2. LH2 run at 5 uA, max anode current (column 2) is 7 uA. hTRIG1 >2e6 at present threshold values
  3. LD2 run at 3 uA, max anode current column 2 is 7 uA.
    - Label CODA runs "Lumi-Scan"

### 3. Took reference LD2 run 4588, 30 min at 2 uA

### 4. **18:00. 24-Feb-2024** Move Calorimeter back to 6.0 m

## 2. KinC\_x36\_6 Production Label CODA runs **KinC\_x36\_6**

- HMS Collimator LARGE
- Critical to adjust beam current to keep NPS Calo Anode current Max <= 12 uA
- Need positron runs (HMS polarity reversed) with 10% of beam time (rescheduled for Tuesday)
- **Keep carefull watch of 50K replay for sign of NPS crate failure (bands of anomalous values in pages 1, 7, 9, etc.**
  - As needed, stop and restart coda run. If this is not sufficient, reboot all NPS crates (see howto link above)

### 1. LH2 Production (New settings for Saturday evening)

- ⇒ 1. **Eight 30-min runs , ps4=0, Beam 11 uA** , CODA config coin\_sparse
- First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
  - Make sure maximum anode current in Calo is <= 12 uA
2. One 20-min run at 8 uA, coin\_sparse, ps4=0

3. One 30-min run at 6 uA, coin\_sparse, ps4=0
  4. One 15-min run at 11 uA (or same as production), **coin** , ps4=0
  5. First cycle only: One 20-min run at ~~5~~<sup>6</sup> uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
2. Dummy Target
    1. 30 min run at 11 uA, coin\_sparse, ps4=0
    2. 20 min run at 8 uA, coin\_sparse, ps4=0
    3. 20 min run at 6 uA, coin\_sparse, ps4=0: (First cycle only)
  3. LD2 Target
    1. **Sixteen 30-min runs**, ps4=0, ~~5~~<sup>6</sup> uA CODA config coin\_sparse,
      - First run, make screen shots of CODA Data Rate, Event Rate, Trigger scalers, Calo screens
    2. One 20 min run at ~~4~~<sup>5</sup> uA, coin\_sparse, ps4=0 (~~Skip if MCC cannot control 1 uA~~)
    3. One 20 min run at ~~3~~<sup>4</sup> uA, coin\_sparse, ps4=0
    4. One 15 min run at ~~5~~<sup>6</sup> uA (or same as production), **coin** , ps4=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
    5. First cycle only: One 20-min run at ~~5~~<sup>6</sup> uA, coin\_sparse, ps3=0 (prescaled as needed to keep CODA Data rate less than 130 MB/s)
3. Repeat Full LH2+Dummy+LD2 cycle until Monday ~11 am

▪ **Monday 26-Feb-2024 day shift**

1. BCM Calibration with injector Faraday cup
2. Return to production cycle above

▪ **Tuesday 27-Feb-2024 day shift**

1. Positron run
  1. Switch HMS polarity to +2.416 GeV/c (positrons, aka protons) = 0.66142 Tesla.
    1. Ramp to 0
    2. Switch polarity
    3. use go\_magnets to ramp all magnets to MOL, then setpoint
    4. Adjust final Dipole current in small steps to get exact field in NMR lock
  2. Complete one cycle (18 hours?) of positron running.
  3. LH2 Production
    1. **Eight 30-min runs** , ps4=0 **5 uA** , CODA config coin\_sparse
  4. Dummy Target
    1. 30 min run at 5 uA, coin\_sparse, ps4=0
    2. 30 min run at 2 uA, coin\_sparse, ps4=0
  5. LD2 Target
    1. **Sixteen 30-min runs**, ps4=0, **2 uA** , CODA config coin\_sparse,
2. Switch back to electrons Tuesday morning.

- **Tuesday 27-Feb-2024 day shift**
- Reverse HMS polarity back to -2.416 GeV/c (electrons)
  - Resume LH2+Dummy+LD2 cycles
  - Continue until 07:30 am Monday 4-March-2024

- **Wednesday 28-Feb-2024 day shift** SAD
- **Thursday 29-Feb-2024 day shift** Moller
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The instructions below are for previous shifts and are kept here for the record.

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