Optics Procedure for 2.5T, 90deg Target Field

Instruction for Shift Leader:

Here is the optics plan for the new right septum. The chicane setting is for 2.5T, 90deg target field, the beam energy is 1.70669 GeV.

For optics, we always use 100nA beam. The rasters should be off except special specified. Usually take 2 runs for each configuration, each run for 1M events with LHe or 0.3M without LHe.

1. Pointing (Estimated time: 40 min)[1]:

a. Check whether the sieve status is IN. If not, tell the expert and ask for an escorted access to move the sieve slit.

b. Check the HRS momentum setting. Make sure both of them are C12 elastic peak[2] (delta=0%, detial values will be given in the table). Make sure the septa current are correct for both arms. In case the HRS momentum need to be increase, you will need to CYCLE Q2, Q3 before set it to the new value.

c. Ask the target operator to move the target to C12.

d. Ask MCC to send 100nA beam at the position of (0,0), take one run.

e. Ask the target operator (maybe with the help of target experts) to **drain OUT** the LHe. Keep taking data at the same time, 1M events each run.

f. During the target experts is draining the LHe out, ask 3rd person to keep checking T1&T3 scaler rates to tell whether LHe is drained OUT.

2. Acceptance Study (Part 1, estimated time 50 min):

a. Keep HRS and septa current configuration at delta=0%, stay at C12 target.

b. Ask MCC to turn on the fast raster with 2x2mm, and send 100nA beam with position (0,0). Check the beam position on Hall A General Tools screen. Then take 2 runs, do spot++ to check the beam position and make a halog.

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1 The actual time used may be longer than the estimated time, but please notify the student experts if you haven't finished the stage within 1.5 times the estimated time.

2 To calculate the elastic energe and septa current, use these 2 executable in ~adaq/GetElasE ~adaq/GetSeptaCurrent..

c. Notify MCC that we need to turn on the slow raster. Ask student expert to turn on the slow raster1.5V or 2cm diameter). Take 2 runs.

d. Let MCC know that we need to turn off both fast raster and slow raster. Ask student expert to turn off the slow raster. Take 2 run.

3. Delta scan (Estimated time:240 min):

There is 2 ways to do the delta scan:

1) start from 0% → 2% → 4% → cycle to -4% → -2% → 0%

2) cycle to -4% → -2% → 0% → 2% → 4% → cycle to 0%

Option 2) might save some change over time at teh beginning or at the end if can be combined with other plan. Please discuss with the expert which option will be followed.

a. Keep sieve IN, C12 target, no LHe.

b. Asuuing use opting 1), set the LHRS delta (dp) to be 1%, 2%, 3%, 4%, **CYCLE** Q2, Q3, then -4%, -3%, -2%, -1%. simultaneously set RHRS momentum to be 2%, 3.5%, **CYCLE** Q2, Q3, then -3.5%, -2%. For each setting, set septa current to be the corresponding values in the table.

c. For each configuration, take 2 runs, halog the scaler rate once , replay at least one run for each arm, halog the focus and target pannel corresponded to the right delta(dp) value.

4. Beam position cross scan (Estimated time: 240 min):

If possible, please combine this part with BPM calibration(sieve in, no Lhe).

a. Keep the HRS momentum setting to be delta=0% , and C12 target, no LHe.

b. Follow the detailed configuration in the table, ask MCC to move the beam position, check the beam position on the Hall A General Tools screen.

c. Ask 3rd person to take two runs for each configuration. For each run, ask 3rd person to do a spot++ check (type spot_L or spot_R on an adaq account) and halog the result.

5. Acceptance study (Part2, estimated time:80min):

a. Set delta=0% , use C12 target without LHe.

b. Ask MCC for an escorted access to move the sieve **OUT**. Student expert will go to the hall to move the Sieve **OUT**.

c. Ask the MCC to turn on the fast raster with 2x2mm and then take 2 runs.

d. Call MCC and tell them we need to turn on the slow raster, ask student expert to turn on the slow raster, then take 2 runs with 1M event.

e. Call MCC and tell them we need to turn off the fast raster and the slow raster, ask student expert to turn off the slow raster, then take 2 runs with 1M event.

2.5T, 90deg Target Field

If liquid helium is in, take 1M events for each run, otherwise 300k..

For each setting, snapshot the scaller rates window once, replay one run for each arm, snapshot the target tab and focus tab at the rigth delta. If beam position changed, take a snapshot for spot++.

Configuration	HRS P_0 (GeV)	Septa I (A)	Event Amount	Run Number	
Pointing, Sieve IN, 40mil C12 target, delta=0					
With LHe	1.7054	538.10	1x1M	L	
		596.08		R	
Draining LHe	1.7054	538.10	?x1M	L	
		596.08		R	
NO LHe	1.7054	538.10	1x0.3M	L	
		596.08		R	
Delta Scan, Sieve IN, 40mil C12 target, LHRS					
0%(optional)	1.7054	538.10	1x0.3M	L	
1%	1.6883	532.54	2x0.3M	L	
2%	1.6713	527.03	2x0.3M	L	
3%	1.6542	521.50	2x0.4M	L	
4%	1.6372	516.01	2x0.5M	L	
Cycle to -4%	1.7736	560.39	2x0.3M	L	
-3%	1.7566	554.82	2x0.3M	L	
-2%	1.7395	549.22	2x0.3M	L	
-1%	1.7225	543.67	2x0.3M	L	
RHRS, do with LHRS simultaneously					
0%(optional)	1.7054	596.08	1x0.3M	R	
2%	1.6713	583.57	2x0.4M	R	
3.5%	1.6457	574.21	2x0.5M	R	
Cycle to -3.5%	1.7651	618.14	2x0.3M	R	
-2%	1.7395	608.66	2x0.3M	R	

Configuration	HRS P_0 (GeV)	Septa I (A)	Event Amount	Run Number Comments	
Acceptance Study Part I, Sieve IN, 40min C12 target, delta=0					
Fast raster	1.7054	538.10	2x0.3M	L	
		596.08		R	
Fast raster + Slow raster	1.7054	538.10	2x0.3M	L	
		596.08		R	
No rasters (optional)	1.7054	538.10	2x0.3M	L	
		596.08		R	
Acceptance Study Part II, Sieve OUT, 40min C12 target, delta=0					
Fast raster	1.7054	538.10	2x0.3M	L	
		596.08		R	
Fast raster + Slow raster	1.7054	538.10	2x0.3M	L	
		596.08		R	
No rasters (optional)	1.7054	538.10	2x0.3M	L	
		596.08		R	

Beam Position Scan, Sieve IN, 40mil C12 target, delta=0%					
Beam Position (0, 0)	1.7054	538.10	1x0.3M	L	
		596.08		R	
(0, 4)	1.7054	538.10	2x0.3M	L	
		596.08		R	
(4, 4)	1.7054	538.10	2x0.3M	L	
		596.08		R	
(4, 0)	1.7054	538.10	2x0.3M	L	
		596.08		R	
(-4, 0)	1.7054	538.10	2x0.3M	L	
		596.08		R	
(-4, -4)	1.7054	538.10	2x0.3M	L	
		596.08		R	
(0, -4)	1.7054	538.10	2x0.3M	L	
		596.08		R	
(0, 0)	1.7054	538.10	1x0.3M	L	
		596.08		R	