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Subject: short summary of night

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HW

Dear all,

last night we first recentered the "normal" optics injection, it needed precycling and was a bit off at production target.

Then we switched to the mode with focus on S6 slits (based on the one in Sergey's thesis, a bit modified by me).

Then one can see a very sharp peak on CG61 which is roughly 20cm behind the S6-slits.

We tested focusing more by making a beam with large angles (998 mg/cm² Pb target).

Peak width at S6 then almost stays the same, varied quad before S6 -> yes, we are at a minimum of peak width.

Scanned peak width with S6 slits, looks like FWHM = 1mm.

In this mode ("S6 focus") with only Seetram we could also inject quite well. We did not optimize so long.

However, it was not as good as in the "normal" mode yet.

We measured dispersions by scaling FRS, only smaller steps because detectors are only +/- 37mm wide.

TA-S6 is not completely achromatic, but also not in theory. At least for 25mm shift at S2, it is only 2mm at S6.

Other dispersions are close to expected (TA-S2 = 6.5m/6.8m, S2-S6 = 11.6m/11.3m).

Measure/Expected

Then we calibrated target thickness (even twice at two energies) -> nominal 1624 mg/cm² Be + 223 Nb.

Measured effective with ATIMA_1.2: 1609 mg/cm² or 1607 mg/cm² Be + 223 Nb.

Also 3 thicknesses by adjusting double wedge: 1.4 g/cm², 2 g/cm², 3 g/cm².

The few mg/cm² do shift peaks by mm !

In these settings one can clearly see that energy-loss straggling in the degrader is the by far dominant effect for

peak width at S6. FWHM ~ 40mm for 3 g/cm² S2 degrader.

But we cannot change it because all degraders at S2 are Al, so energy-loss straggling must contribute a large share.

Last we inserted the target Be+Nb target (no degrader) and injected at 400 MeV/u for ESR tuning.

All settings are saved on scheidenb/paramodi with keyword E121_xx.

The large dispersion for S2-S6 is good for separation, but could really be a problem for good transmission.

In the 205TB case the momentum spread from target is not so large, and energy-loss straggling is large, almost similar.

For TA to ESR it should be matched, but not from S2 -> ESR. This should be better with the smaller dispersion.

This may/will cause a transmission problem.

Hans has prepared a mode with good matching in theory, focus on new S6 scraper and 9m dispersion S2->S6.

The logbook is at <http://web-docs.gsi.de/~weick/logbook.pdf> the pages still must be sorted better.

Some pages I photographed many times, for better photo quality, check the page number in logbook.

Regards,
Helmut

check FRS setting now
at now (17:00)

TA - SIS-window

SEETRAM
TA#1, (23.9, -151.1)

Be Nb No.26 Be/Nb 1624

1609 + 223
or
1607 + 223

Measured
1609 or 1607

TA slit is open

S1 : slit ±10mm

S2 : slit open
now no deg.

S3 } slit open
S5 }

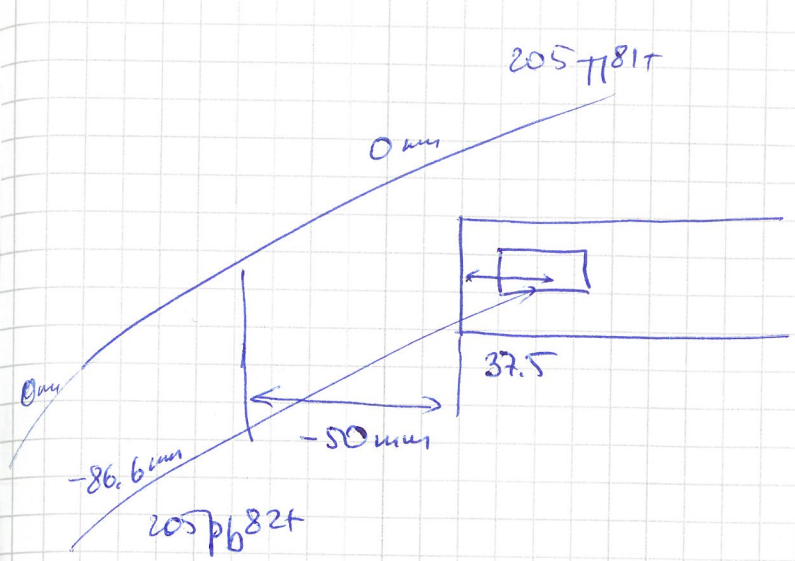
E(SIS) = 541.15
E(TA-S6) = 400 MeV/u

BP TA-S2 : 8.06888
S2-S6 : 8.06838

logbook
say →
11.7m??

Hans has prepared a mode with good matching in theory, focus on new S6 scraper and 9m dispersion S2->S6.

B₀-detector GEO1 DD2AG



if $205\text{TT}81+$ @ 0 mm
 $205\text{Pb}82+$ @ $-122.8 - (-36.2)$ (simulations)
 $= -86.6$

taking into account the size of the detector
 $-86.6 + 37.5 = 49.1$

Beam is at +10 mm put detector @ 60 mm

MWPC GEO1 DD1AG

move in event mode

Subchains

SC 1 E 01 Pre	SC 2 E 02 Injection <i>stacking</i> <i>I_{cool} = 200 nA</i>	SC 3 E 03 Manipulation
SC 4 E 04 Ramp	SC 5 E 05 Manipulation	SC 6 E 06
SC 7 E 07 <i>12x</i>	SC 8 E 08	
SC 9 E 09 Post		

MWPC move in ± 10 mm (arrow pointing to SC 6 E 06)
gas jet (arrow pointing to SC 7 E 07)
MWPC out (arrow pointing to SC 8 E 08)

Signale

Zeige: Alle Breakpoints Manipulationen **Skipping**

- ESR_Yuri_Experiment_1.C1.1_SKIP_ENABLED
- ESR_Yuri_Experiment_1.C1.6_SKIP_ENABLED
- ESR_Yuri_Experiment_1.C1.9_SKIP_ENABLED
- ESR_Yuri_Experiment_1.ALL_SKIPS_ENABLED

I_{cool} = 5, 10, 20 nA

I_{cool} = 5 nA is too low, beam is not kept at this current.

206 pb 81+ setting

PLAN for the afternoon shift

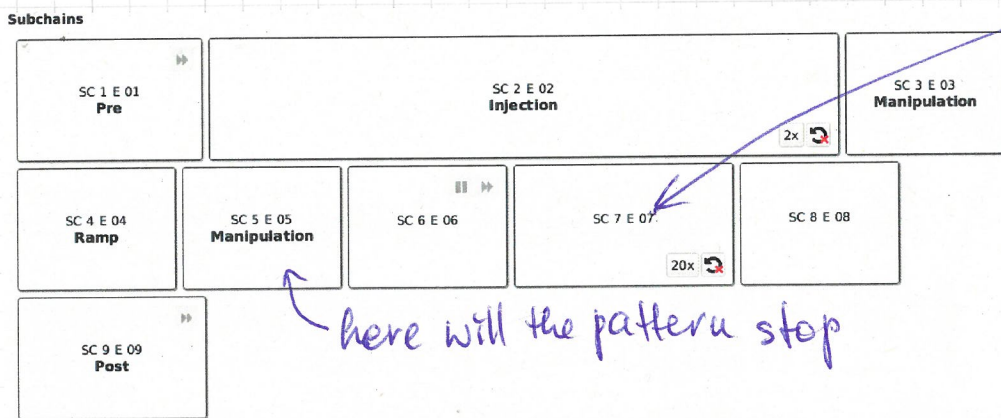
Measure beam lifetime for different Cooler currents

4 measurements for $I_c = 200 \text{ mA}$
 $I_c = 0 \text{ mA}$

1) How?

1) In the running pattern toggle manipulation #5

Important read HOW3 p. 104



gas-jet "on"

here will the pattern stop

Signale

Zeige: Alle Breakpoints Manipulationen Skipping

- ESR_Yuri_Experiment_1.C1.3_WAIT_FOR_MANIP_BY_OP
- ESR_Yuri_Experiment_1.C1.5_WAIT_FOR_MANIP_BY_OP
- ESR_Yuri_Experiment_1.C1.3_PERFORM_MANIP
- ESR_Yuri_Experiment_1.C1.3_WAIT_FOR_MANIP_SAFE
- ESR_Yuri_Experiment_1.C1.5_PERFORM_MANIP
- ESR_Yuri_Experiment_1.C1.5_WAIT_FOR_MANIP_SAFE

toggle here that it is green "on"

2) wait for the time duration, here 30min

3) toggle the same manipulation #5 "off" and then to "on"

The whole pattern will run again and stop at SC 5 "manipulation"

2) How? 2) Change e-current

Redd (6) first!

ParamModi - Resident ParamModi - Expert Trim

ESR Yuri Experiment 1.C1

Ring extraction	Ring Injection	Ring RF	Stochastic Cooling Bump	Target Bump	Vertical Orbit Correction
ESR Manipulation			ESR: Mod	Electron Spectrometer	Horizontal Orbit Correction
Total	Search	Cooler Bump	Cooler E-Beam	Cooler HV	Cooler Magnets
					Cooler Steerer
GAMME value calculated (SC 2)		1.429		UE (SC 8)	219218.5357 V
GAMME value calculated (SC 4)		1.429		USC (SC 2)	31.3992 V
GAMME value calculated (SC 8)		1.429		USC (SC 4)	31.3992 V
Overwrite GAMME (expert) (SC 2)		<input checked="" type="checkbox"/>		USC (SC 8)	31.3992 V
Overwrite GAMME (expert) (SC 4)		<input checked="" type="checkbox"/>		BETA E (SC 2)	0.7143
Overwrite GAMME (expert) (SC 8)		<input checked="" type="checkbox"/>		BETA E (SC 4)	0.7143
GAMME set value (expert) (SC 2)		1.429		BETA E (SC 8)	0.7143
GAMME set value (expert) (SC 4)		1.429		NERF (SC 2)	983331662E12 1/m^3
GAMME set value (expert) (SC 8)		1.429		NERF (SC 4)	983331662E12 1/m^3
DELTA Uacc (SC 2)		-6400.0 V		NERF (SC 8)	983331662E12 1/m^3
DELTA Uacc (SC 4)		-6400.0 V			
DELTA Uacc (SC 8)		-6400.0 V			
Electron current IE (SC 2)		200.0 mA			
Electron current IE (SC 4)		200.0 mA			
Electron current IE (SC 8)		200.0 mA			
Cooler magnetic field BT (SC 2)		0.1 T			
Cooler magnetic field BT (SC 4)		0.1 T			
Cooler magnetic field BT (SC 8)		0.1 T			
ECORR					
FIX5 (SC 2)		0.0 mrad			
FIX5 (SC 4)		0.0 mrad			
FIX5 (SC 8)		0.0 mrad			
FIY5 (SC 2)		0.0 mrad			
FIY5 (SC 4)		0.0 mrad			
FIY5 (SC 8)		0.0 mrad			

Contexts

- CRYRING_D_local_manipulation
- ESR_Yuri_Experiment_1
- ESR_Yuri_Experiment_1.C1
- SIS18_FAST_20200325_070808
- SIS18_FAST_HTD_20200325_071947
- SIS18_FAST_HTP_20200327_004548
- SIS18_SLOW_HTD_20200326_181400

Buttons: Send to hardware, Discard Changes, Manipulate

1) refresh before doing any changes

2) our ESR pattern

Important read HOW3 p.104

TCL1030-2

3) this is the panel where cooler parameters are modified

4) See picture on p.102. the cooler is needed in manipulation #5. The cooler processes are available in SC04 and SC08. if we set Cooler current in both machines to the needed value, it remains the same in SC05.

Set I_cool in SC04 & SC08

5) send to hardware

6) Changes of Cooler Current only with (see HOW3) Stopped pattern

How 3 ! How to stop the pattern !

Subchains

- SC 1 E 01 Pre
- SC 2 E 02 Injection
- SC 3 E 03 Manipulation
- SC 4 E 04 Ramp
- SC 5 E 05 Manipulation
- SC 6 E 06
- SC 7 E 07
- SC 8 E 08
- SC 9 E 09 Post

Signale

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- ESR_Yuri_Experiment_1.ALL_SKIPS_ENABLED

① Go to skipping

② While NOT in machines 01 and 09 disable the respective skipings by toggling them to „red“

GSI-Patterns Von OP aktiviert Gruppe deaktivieren

<p>SIS18_FAST_20200325_070808</p> <p>ESR via TS (FAST) &1</p> <p>$^{206}\text{Pb}^{67+}$ 541.15 MeV/u</p> <p>U 09 S 01</p> <p>PILOT_BEAM</p> <p>1x</p>	<p>SIS18_FAST_HHD_20200325_071947</p> <p>HHD (FAST)</p> <p>$^{206}\text{Pb}^{67+}$ 593.16 MeV/u</p> <p>U 09 S 05</p> <p>PILOT_BEAM</p> <p>1x</p>	<p>SIS18_SLOW_HTD_20200326_181400</p> <p>HTD via TH (SLOW)</p> <p>$^{206}\text{Pb}^{67+}$ 1075.0 MeV/u</p> <p>U 10 S 02</p> <p>PILOT_BEAM</p> <p>1x</p>	<p>SIS18_FAST_HTP_20200327_004548</p> <p>HTP via TH (FAST)</p> <p>$^{206}\text{Pb}^{67+}$ 500.0 MeV/u</p> <p>U 10 S 03</p> <p>PILOT_BEAM</p> <p>1x</p>
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ESR-Patterns Von OP aktiviert Gruppe deaktivieren

ESR_Yuri_Experiment_1

&1 ESR_RING

$^{206}\text{Pb}^{81+}$ 399.5 MeV/u

E 01 - E 09

NO BEAM

1x

③ Toggle pattern to stop

Crying-Patterns Von OP aktiviert Gruppe deaktivieren

CRYRING_D_local_manipulation

CRYRING RING

$^2\text{H}^+$ 15000.0 keV/u

NO BEAM

1x

④ Wait until pattern runs through and stops.