HMS Controls Upgrade

Presented at the Hall C User Meeting

by Steven Lassiter

January 6, 2006

HMS Controls Systems

- Rotation system: Completed.
- I/O Cables: Pulled from counting house 2nd floor down to the HMS carriage.
- Dipole: Completed.
- Quadrupoles: Q3 ½ done.
- HMI: Up and running, nearly complete.

Quadrupole Status

- I/O Rack for Q3 has been wired internally, waiting to move into Hall.
- Control Chassis's for Quads have been installed in a rack on the 2nd floor Counting House. Wiring for this is about 40% complete.
- Tech has been hired to do cable terminations and Q1 and Q2's I/O racks.

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HMS - RSView SE Client

Logbook | Help | Login | Rotation | HMS

HMS Q1 | HMS Q2 | HMS Q3 | HMS Dipole

PSU | NMR | Valves | LHe | LN2 | Forces | Voltage | Interlock

Silence Alarm

Hall Status
Restricted Access
0 MeV 0.00 uA

Quad 1
Power Supply
Off

Quad 2
Power Supply
Off

Quad 3
Power Supply
Off

Dipole
NMR
Off
Power Supply
Off

Primary
PLC Status: OK
Secondary
PLC Status: OK

High Momentum Spectrometer

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High Momentum Spectrometer

Hall A 4K Supply Flow: 31.1 g/s
Hall B 4K Supply Flow: 4.1 g/s
Hall C 4K Supply Flow: 7.1 g/s

Momentum Input (GeV) 0.40000 | Start | Stop | Electron | Proton | Ramp All to Zero Amps

Input Ok

Q1 at Current | Q2 at Current | Q3 at Current | Dipole at Field

Q1 Q2 Q3 Dipole
Spectrometer is Off

Using Standard Tune

4K Return 5.43 K
5.26 K 4K Supply
ESR
4K Supply
4K Return
4.57 K
5.40 K
Ln2 Level 72 %
70.41 %

LHe LN2 PSU
Ln2 Level 10 %
-10.25 %
RB: 0.0 A
Set: 52.0 A
-0 Gauss

LHe LN2 PSU
Ln2 Level 10 %
-10.25 %
RB: 0.0 A
Set: 41.2 A
-1 Gauss

LHe LN2 PSU
Ln2 Level 10 %
-10.25 %
RB: 0.1 A
Set: 20.5 A
0 Gauss

PSU NMR LHe Ln2
Set 0.1099411 T
RB 0.1073215 T
0.1 A

SOS Angle 146.96
HMS Angle 86.99

Print

Set /V {::[HallC]Program:Dipole_Program.NMR_GetStatus} 1

Clear | Clear All

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Quad 3
Power Supply
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Dipole
NMR
Off

Power Supply
Off

Primary
PLC Status: OK
Secondary
PLC Status: OK

Dipole Power Supply

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HMS Dipole Power Supply

Reset | Power is Off

Set 000000 ADC 00003

Polarity: Pos. | Neg.

Set Current 0.0000 Amps | Ramp Rate: 1540.00 mA/sec. | Set Rate

0.00 Readback

Remote | PSU is Off | Clear | Change in Progress

Ramp to Zero Amps.

I True: 0.09 Amps

0.00 Amps

0.000 Output Voltage

- Regulation Transformer not Zero
- Software Fast Discharge
- Software Slow Discharge
- One Transistor Fault
- Interlock Sum
- DC Overcurrent
- DC Overload
- Regulation Module Failure
- Preregulator Failure
- Phase Failure
- MPS Waterflow Failure
- Earth Leakage Failure
- Thermal Breaker / Fuses
- MPS Overtemperature
- Panic Button / Door Switch
- Magnet Waterflow Failure
- MPS Not Ready

Reset Interlocks

Hardware Status
- 480 power
- Interlock Sum
- Main Power
- MPS Ready

Print

Dipole NMR

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HMS Dipole NMR

Reset | Power is Off

NMR LOCK | 0.1073215 | Tesla | MHz | Power is Off | Field + | Field -

PROBE RANGE [T]
1 0.043 - 0.13
2 0.09 - 0.26
3 0.17 - 0.52
4 0.35 - 1.05
5 0.7 - 2.1
6 1.5 - 3.4
7 3.0 - 6.8
8 6.0 - 13.7

Rem Search | TOO HIGH | TOO LOW

Auto | Manual | Search Mode

B Set
B

Dipole at Field

Momentum Input Mode | Momentum Input (GeV) 0.4000 | Start | Off

Field Set Value (Tesla): 0.1099411 | Input Ok

- Data Ready
- Syntax Error
- Regulation
- Local Button
- No Signal
- Fast Display
- Task Finished
- Alarm Status 6
- Alarm Status 7
- Filter Off
- Missing Command
- Error in Probe Connection
- Window Too Small
- Window Too Large
- Target Value Out Of Range
- Error in Data value
- Configuration Not Correct
- Error Writing EEPROM
- NMR Signal Not Found
- NMR Signal Lost Temporarely
- NMR Signal Lost
- MPS Not Stable
- Not in Center of Window
- Correction Out of Window
- Display Not in Tesla
- Ignore Data

Clear Status Bits

0.00 Amps | Clear Message | Power Supply Ready | BI Curve

Setup | Print | Settings

Display NMR_Display /CC | Clear | Clear All

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0 MeV 0.00 uA

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Power Supply
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Dipole
NMR
Off
Power Supply
Off

Primary
PLC Status: OK
Secondary
PLC Status: OK

Dipole Valves

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HMS Dipole Valves

TL LN2 Shield: 127.9 K

LN2 Supply

LN2 Return

JT 3 -7.8 %

JT 4 -0.1 %

LN2 Level 73.8 %

1234.86 mBar

77.4 K

78.2 K

Average 77.87 K

LN2 -8.6 %

Dipole

238.5 K

300 K He Gas

3.9 ATM 1.1 g/s

Mix -5.6 %

217.4 K

JT 2 -8.7 %

Valve Control Keyswitch

PLC

ESR Data

0.00 Amps

LHe Supply 5.4 K

JT 1 -7.8 %

JT 5 29.0 %

Current Leads

JT 7 40.4 %

JT 8 38.9 %

4936 l/h

4952 l/h

Warm Return 1.1 ATM

BV -5.2 %

Cold Return 4.6 K

JT 6 60.7 %

LHe Level 70.1 %

1336.26 mBar

4.8 K

8.2 K

Average 4.61 K

JT Setup

Cooldown

Print

Display Dipole_valve_page /CC

Clear | Clear All

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Power Supply
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Primary
PLC Status: OK
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PLC Status: OK

Dipole Helium Temperatures

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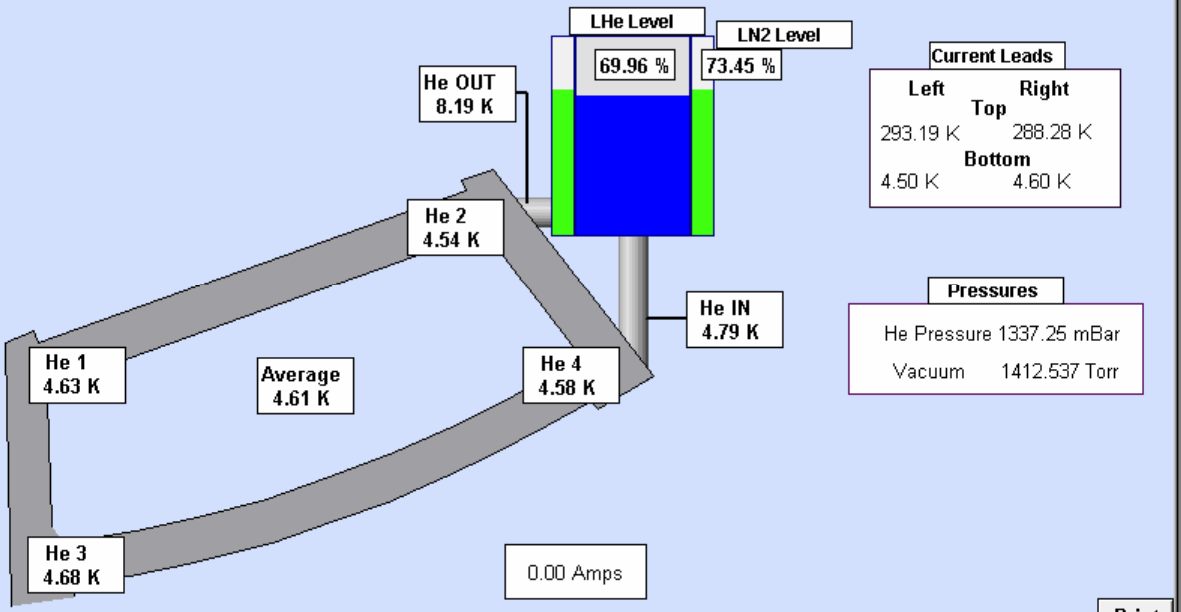
HMS Dipole Helium Temp



Current Leads

Left	Right
Top	
293.19 K	288.28 K
Bottom	
4.50 K	4.60 K

Pressures

He Pressure 1337.25 mBar
Vacuum 1412.537 Torr

Print

Display Dipole_LHe_temp /CC

Clear | Clear All

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0 MeV 0.00 uA

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PLC Status: OK

Dipole Interlocks

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HMS Dipole Interlocks

Keep Alive Timer

Reset Interlock

No Interlock
Fast Discharge
Slow Discharge

Fast Discharge
Fast Discharge by Operator

Slow Discharge
Slow Discharge by Operator

QD Main Coil Right
QD Main Coil Left
QD Left Current Lead
Chnnel 1 Upper | Chnnel 1 Lower

QD Channel 3
Chnnel 3 Upper | Chnnel 3 Lower
QD Right Current Lead
Chnnel 4 Upper | Chnnel 4 Lower

Software Quench Detector
U2 | U4 | U6 | U1
U3 | U5 | U7 | U8

Current Lead Mass Flows
Flow Left too Low | Flow Right too Low
Flow Left Error | Flow Right Error
Flow Left Fault | Flow Right Fault

Current Lead Temperatures
Temperature Left Current Lead Error
Temperature Right Current Lead Error
Temperature Left Current Lead Fault
Temperature Right Current Lead Fault

Magnet Temperature
T1 Error | T3 Error | T1 Fault | T3 Fault
T2 Error | T4 Error | T2 Fault | T4 Fault
T1 Too High | T3 Too High
T2 Too High | T4 Too High

Bobbin Delta T
Delta T1 | Helium Error
Delta T2 | Delta T3

Liquid Helium Level
Helium Pressure
Nitrogen Pressure
Cryo Interlock

Vacuum Pressure
Penning Vac Guage
Thermovac Guage

Power Supply Interlock

0.00 Amps

Support Link Forces
L1 Fault | R1 Fault | L1 too High | R1 too High
L2 Fault | R2 Fault | L2 too High | R2 too High
L3 Fault | R3 Fault | L3 too High | R3 too High
L4 Fault | R4 Fault | L4 too High | R4 too High

Setup

Print

Display Dipole_interlock /CC

Clear | Clear All

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0 MeV 0.00 uA

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Power Supply
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Power Supply
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Quad 3
Power Supply
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Dipole
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Off
Power Supply
Off

Primary
PLC Status: OK
Secondary
PLC Status: OK

Quad He Temps

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HMS Q1 He Temp.

PT-100's	
Max.	-0.00
Avg.	0.00
Min.	0.00

Carbon Glass	
Max.	4.61
Avg.	4.34
Min.	4.18

Update CG Temps. every 3000 mS

Helium Pressure	10.250	Atm.
Vacuum Pressure	6.7E-14	Torr
Pirani Guage:	1412.53	
Penning Guage:	6.7E-14	

-10.25 Amps

LHe Level
-10.25 %

LN2 Level
10.25 %

Supply
PT-9 &10 10.25 K

Coil Center
PT-5 10.25 K

Base
10.25 K PT-21 & 22

Return
-10.25 K PT-11 & 12

10.25 K PT-1
Yoke Top

Yoke Top
PT-3 -10.25 K

PT-7 -10.25 K
Coil End

Coil End
PT-8 -10.25 K

PT-4 -10.25 K
Yoke Bottom

Average
4.34 K

4.18 K Coil 4
4.22 K Coil 1
4.61 K Coil 3
4.34 K Coil 2

Yoke Bottom
10.25 K PT-2

10.25 K PT-6
Coil Center

Using Carbon Glass Tempatures

Print

Display Quad_He_Temps /TQuads\Q1,Q1 /CC

Clear | Clear All

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Power Supply
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Dipole
NMR
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Power Supply
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Primary
PLC Status: OK
Secondary
PLC Status: OK

Spectrometer Rotation

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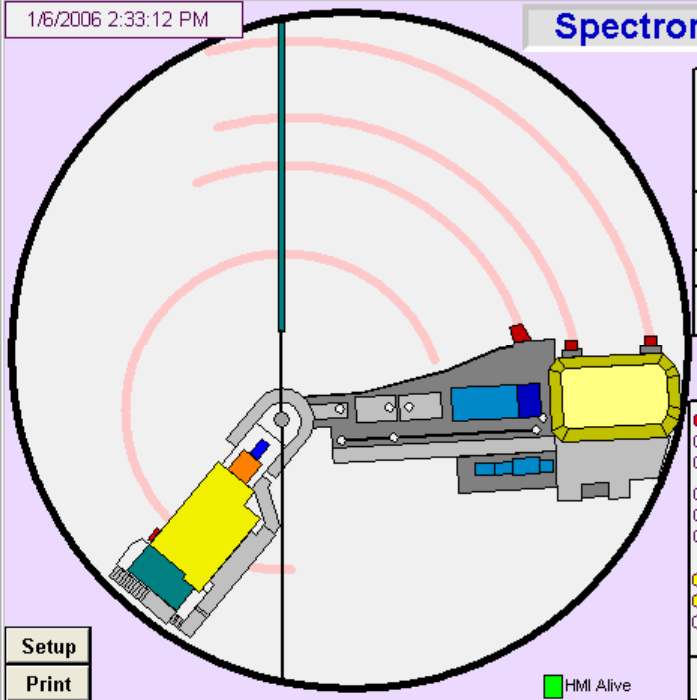
Spectrometer Rotation



HMS Angle	SOS Angle
86.99	146.96
Min: 10.65	Min:
Max: 90.00	Max:

Range: High / Low

HMS Selected | Select SOS

Rotate To: 141.20 — 141.20 — Type in angle Press Enter

Start | Reset | Stopped

Power On
Local
Remote

UPS On
Auto
Manual

HMS at Angle
HMS Forward
HMS Reverse

SOS at Angle
SOS Forward
SOS Reverse

HMS Forward Prox.
HMS Reverse Prox.
HMS Drive Controler

SOS Forward Prox.
SOS Reverse Prox.
SOS Drive Controler

HMS Offset: 0.00 | SOS Offset: 0.00

Setup
Print

HMI Alive

Display Rotation /CC

Clear | Clear All