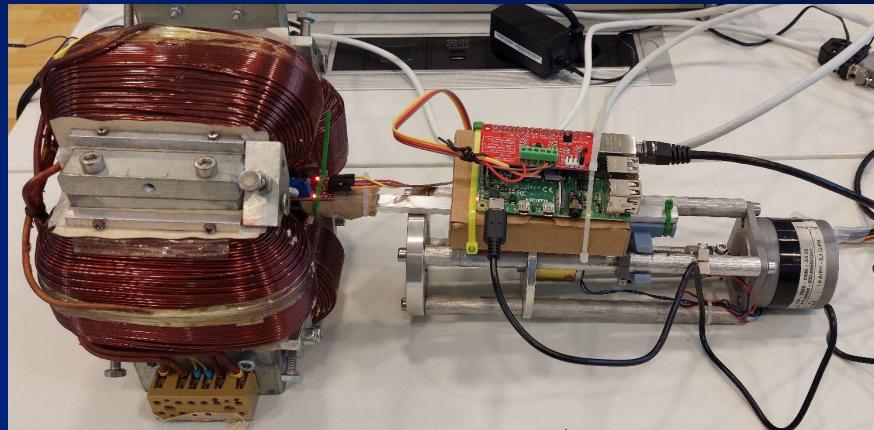
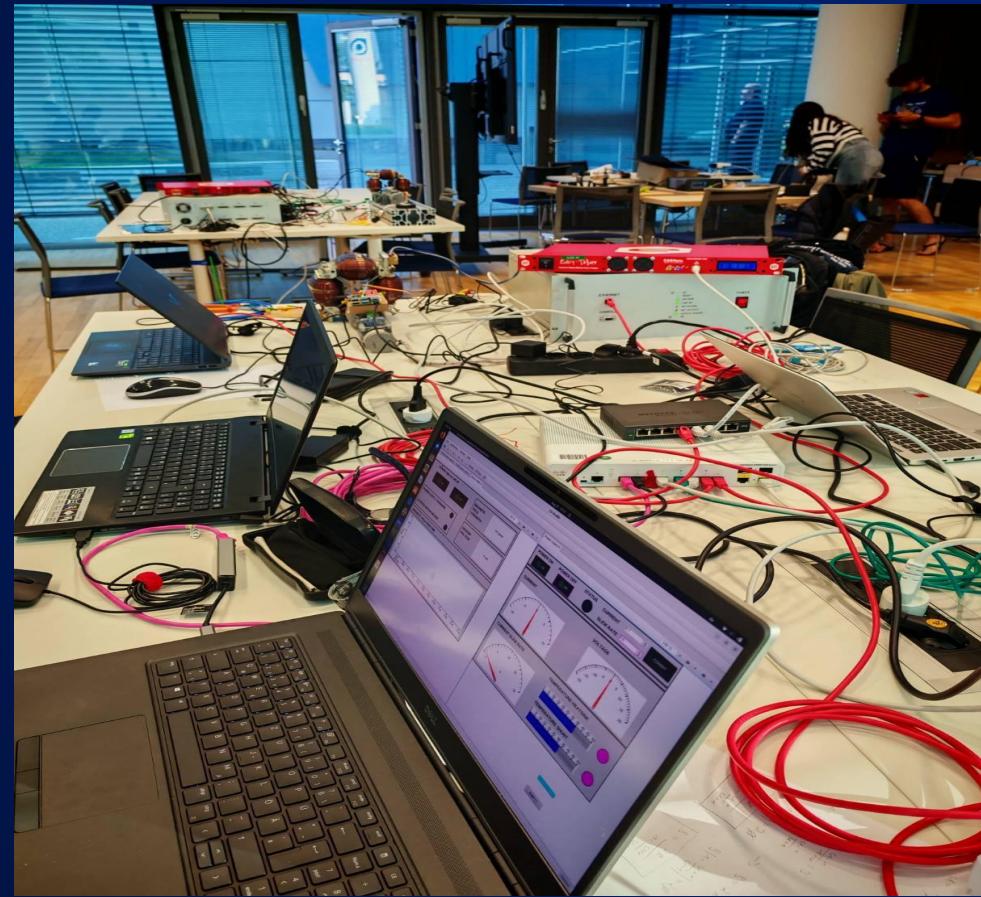


# EPIC Magnets 84





T

01

Description of  
the project

03

Experiment  
scheme

02

Equipment for the  
experiment  
(Hardware)

05

Results

04

Software



# of the project

- connect hardware
- develop IOCs for each device
- create GUI for display and control
- invent bluesky-script (experiment recipe)

T  
2

02

## Equipment for the experiment (Hardware)





# Equipment for the experiment

- **Power supply:**

Voltage: [-21, 21]

Currente:[-10, 10]



- **Gaussmeter & Raspberry Pi:**

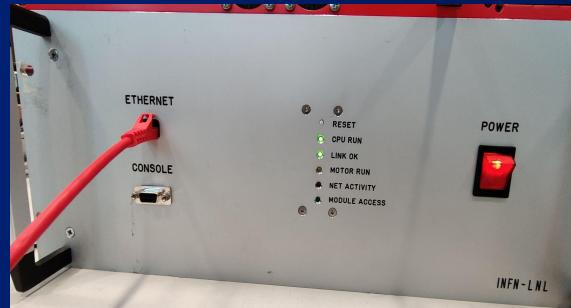
measure magnetic  
field via python-script



- **Motor & driver**

Step angle:  $1.8^\circ$ ;  $360^\circ = 1 \text{ mm}$

→ 200 steps = 1 mm

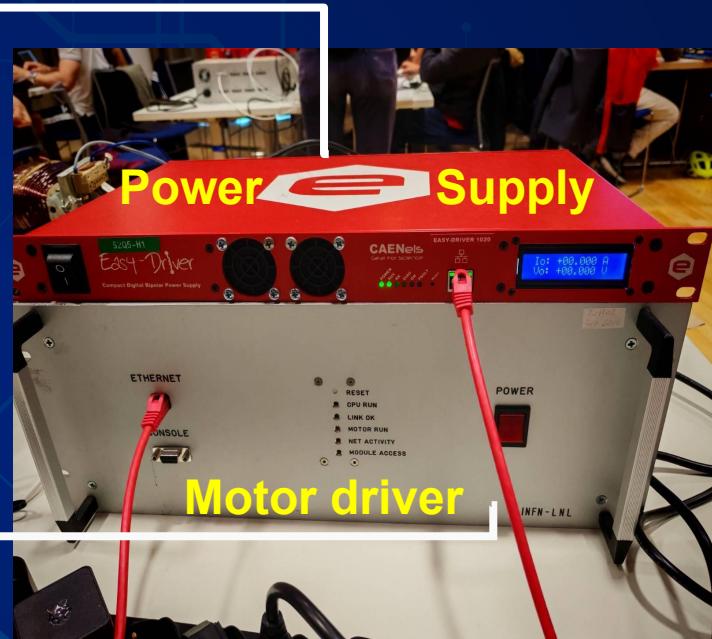
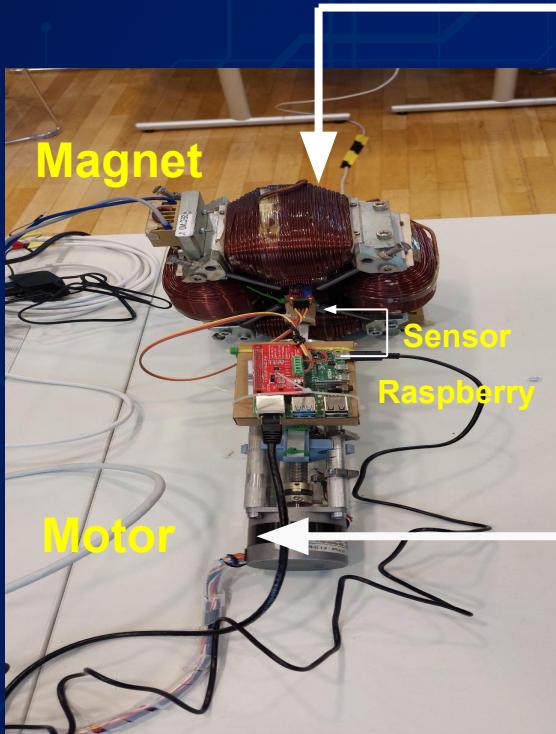


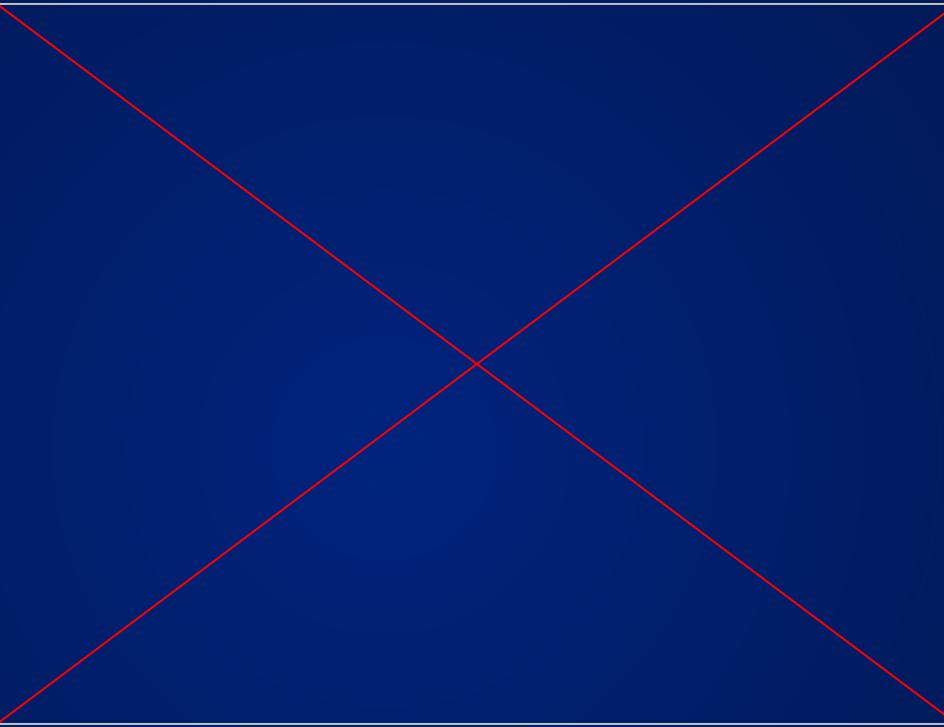


03

## Experiment scheme

# Experiment scheme





A complex circuit board pattern in light blue and white against a dark blue background. Numerous glowing blue dots of varying sizes are scattered across the board, connected by thin lines, creating a sense of data flow and computation.

04

# Software

# IOC



## Before

```
Activities Terminal Aug 28 13:21
locadm@EpicsSummerSchool: ~/Desktop/Project_MF/epics-sumsh-gr1/locBoot/locmgfield
locadm@EpicsSummerSchool: ~/Desktop/Project_MF/epics-sumsh-gr1/loc...
## Register all support components
dbLoadDatabase "dbd/ngfield.dbd"
dbLoadDatabase "dbd/EasyDriverTest.dbd"
file "/var/www/html" "/dbStatic/dbdxEasyDriverTest.c" line number=277 dbRead opening file dbd/EasyDriverTest.dbd
# Set up ASYN ports
devEasyDriverConfigure("L1","172.30.84.111:10001", 0x1)
asynSetTraceMask("L1_TCP", -1,0x2)
## Load record instances
#dbLoadRecords("./db/ngfield.db", "user=locadm")
#dbLoadRecords("./db/devEasyDriver.db", "user=locadm")
#dbLoadRecords("./db/asynRecord.db", "user=locadm")
#dbLoadRecords("./db/locInt.db", "user=locadm")
dbLoadRecords("./db/asynRecord.db", "P=easyDriver, R=asyn, PORT=L1_TCP, ADDR=0, OMAX=0, IMAX=0")
filename="/dbStatic/dbdxEasyDriverTest.c" line number=277 dbRead opening file ../../db/asynRecord.db
ERROR failed to load './db/asynRecord.db'
dbLoadRecords("./db/devEasyDriver.db", "P=easyDriver, R=91, PORT=L1, RANGE=5, NELM=10000")
filename="/dbStatic/dbdxEasyDriverTest.c" line number=277 dbRead opening file ../../db/devEasyDriver.db
ERROR failed to load './db/devEasyDriver.db'
# Start IOC
cd /home/locadm/Desktop/Project_MF/epics-sumsh-gr1/locBoot/locmgfield
locStart()
Starting locInt
#####
##### EPICS R7.0.9
## Rev. 2025-08-12T16:56+0200
## Rev. Date build date/time:
##### Configuration was unavailable.
cas WARNING: Configured TCP port was unavailable.
cas WARNING: Using dynamically assigned TCP port 38239,
cas WARNING: All EPICS servers share the same UDP port.
cas WARNING: Depending on your IP kernel this server may not be
cas WARNING: reachable with UDP unicast (a host's IP in EPICS_CA_ADDR_LIST)
locRun: All initialization complete
## Start any sequence programs
#sed s/nmcngfield,"user=locadm"#
epics>
```

## After

```
epics> dbl
PWRSPLO:readI
PWRSPLO:readslewrate
PWRSPLO:temp1
PWRSPLO:temp2
PWRSPLO:readV
PWRSPLO:DLink
PWRSPLO:currentchange
PWRSPLO:changecurrent
PWRSPLO:putI
PWRSPLO:set_slew
PWRSPLO:change_slew
PWRSPLO:confirm
PWRSPLO:confirm_slew
PWRSPLO:on
PWRSPLO:off
PWRSPLO:reset
PWRSPLO:ID
PWRSPLO:readreg
epics>
```

# BlueSky



Before

```
# Create and configure the RunEngine
RE = RunEngine()
# print("%f", mot.motor_rdist_mm)
gaussmtr.ton()
psu.set(5)
# Subscribe a LiveTable to show the current readback
RE.subscribe(LiveTable([motor.readback,psu.current_RB,gaussmtr.readback]))

# Perform a scan moving the PSU setpoint from 0 A to 7 A in 11 steps
RE(scan([psu.current_RB,gaussmtr.readback], motor, 0,20, 21))

CA.Client.Exception.....  
Warning: "Channel write request failed"  
Context: "op=1, channel=GSMTR:turnon, type=DBR_STRING, count=1, ctx="GSMTR:turnon""  
Source File: ./oldChannelNotify.cpp line 160  
Current Time: Thu Aug 28 2025 11:28:30.435978765  
.....  
  
TimeoutError  
Traceback (most recent call last)  
File /opt/tljh/user/lib/python3.12/site-packages/ophyd/signal.py:1413, in EpicsSignalBase._get_with_timeout(self, pv, timeout, connection_timeout, count, as_string, form, use_monitor)  
    1412 try:  
-> 1413     self.wait_for_connection(timeout=connection_timeout)  
1414 except TimeoutError as err:  
  
File /opt/tljh/user/lib/python3.12/site-packages/ophyd/signal.py:1355, in EpicsSignalBase.wait_for_connection(self, timeout)
```

After

seq_num	time	motor_readback	psu_current_RB	gaussmtr_readback	
1	12:03:10.7	-0	5	153	
2	12:03:13.1	1	5	152	
3	12:03:15.5	2	5	152	
4	12:03:17.9	3	5	152	
5	12:03:20.3	4	5	153	
6	12:03:22.7	5	5	153	
7	12:03:25.1	6	5	154	
8	12:03:27.5	7	5	153	
9	12:03:29.9	8	5	154	
10	12:03:32.3	9	5	154	
11	12:03:34.7	10	5	155	
12	12:03:37.1	11	5	154	
13	12:03:39.5	12	5	155	
14	12:03:41.9	13	5	154	
15	12:03:44.3	14	5	155	
16	12:03:46.7	15	5	155	
17	12:03:49.1	16	5	156	
18	12:03:51.5	17	5	155	
19	12:03:53.9	18	5	156	
20	12:03:56.3	19	5	155	
21	12:03:58.7	20	5	156	

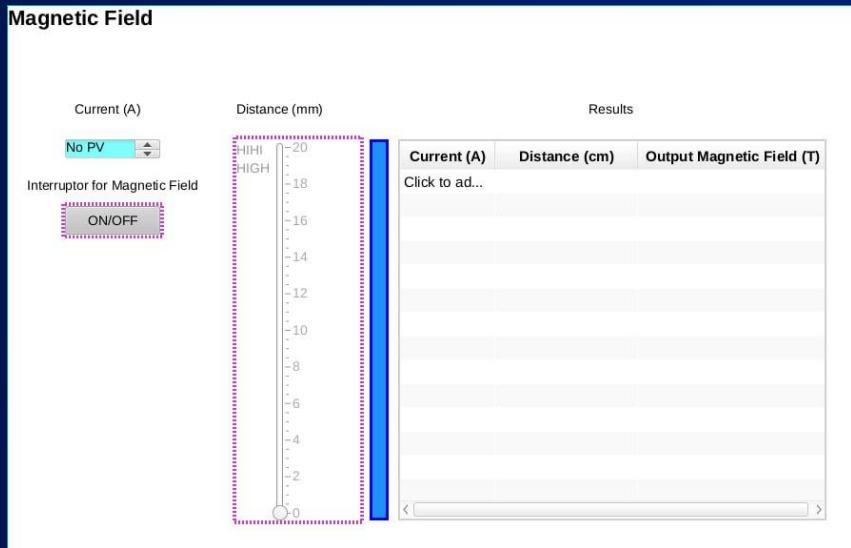
generator scan ['a9a87448'] (scan num: 1)



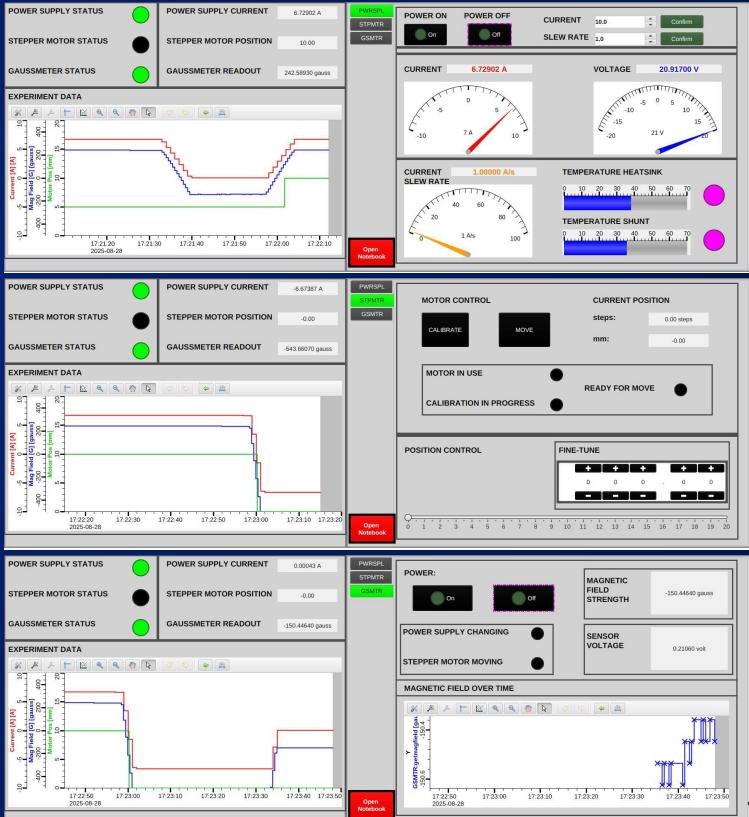
# Phoebus

## Before

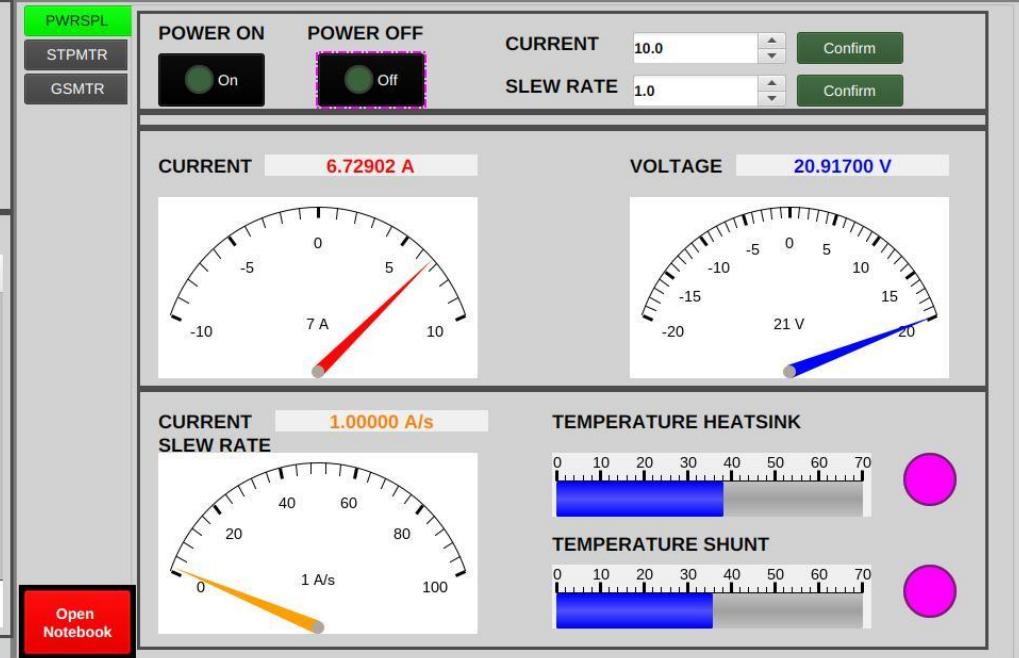
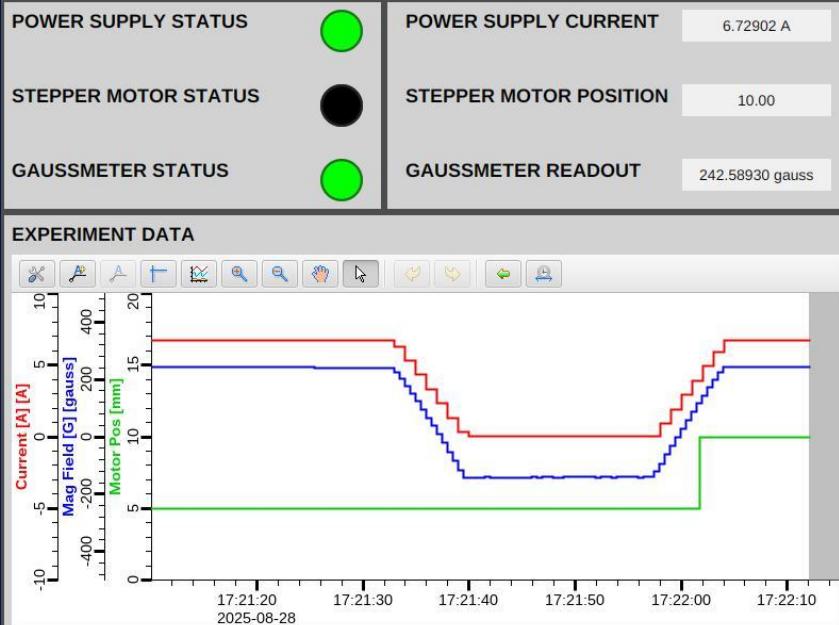
## Magnetic Field



# After



# Phoebus



# Phoebus



POWER SUPPLY STATUS POWER SUPPLY CURRENT -6.67387 A

STEPPER MOTOR STATUS STEPPER MOTOR POSITION -0.00

GAUSSMETER STATUS GAUSSMETER READOUT -543.66070 gauss

EXPERIMENT DATA

Current [A] [A] Motor Pos [mm] Mag Field [G] [gauss]

2025-08-28 17:22:20 17:22:30 17:22:40 17:22:50 17:23:00 17:23:10 17:23:20

PWRSPN  
STPMTR  
GSMTR

MOTOR CONTROL

CALIBRATE MOVE

CURRENT POSITION

steps: 0.00 steps  
mm: -0.00

MOTOR IN USE READY FOR MOVE

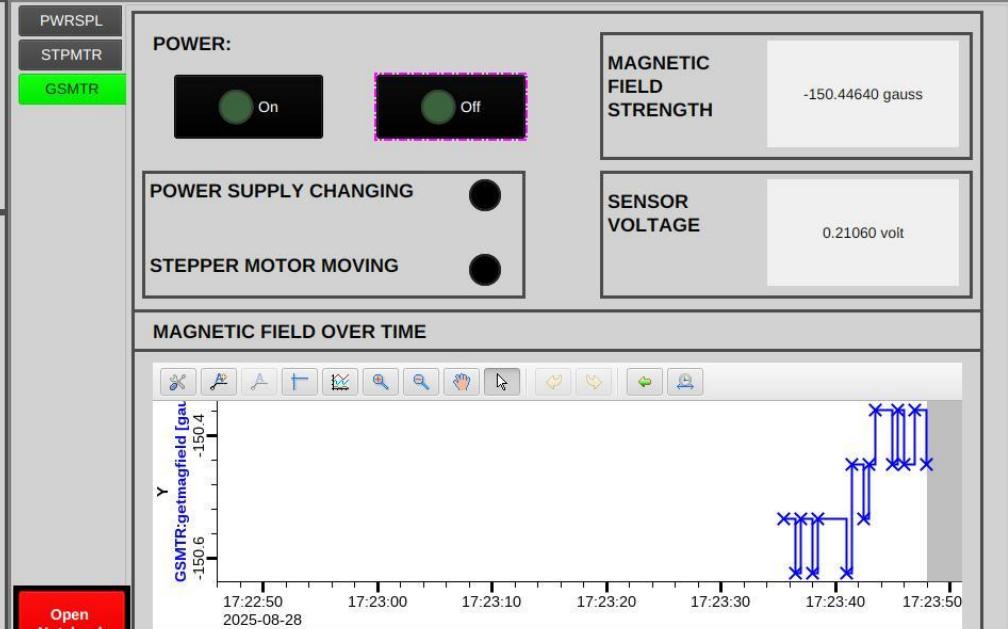
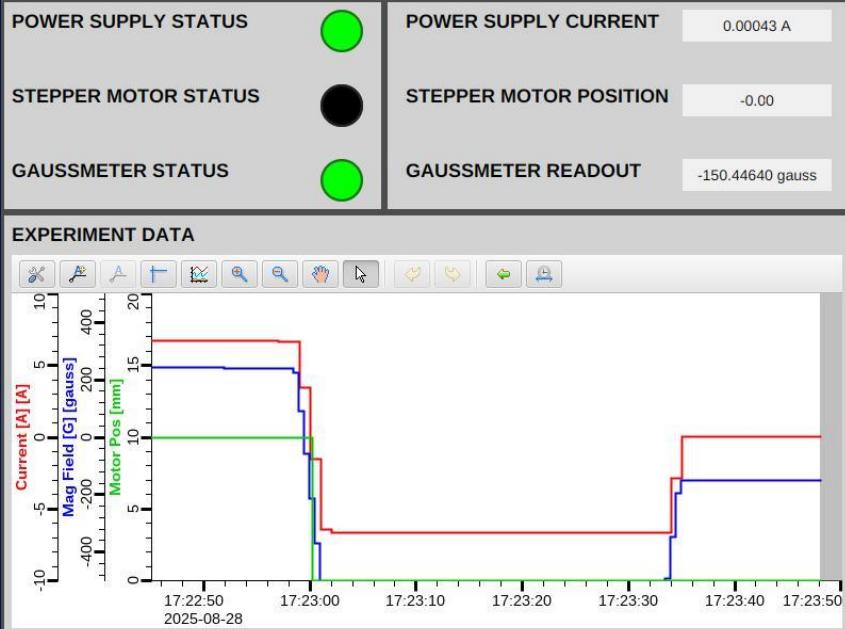
CALIBRATION IN PROGRESS

POSITION CONTROL

FINE-TUNE

Open Notebook

# Phoebus





05

# Results

# Results

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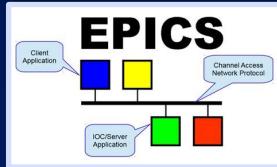
5

## Different currents

	seq_num	time	motor_readback	psu_current_RB	gaussmtr_readback
onoff stat: 1	1	12:07:18.4	20	-6	-539
onoff stat: 1	2	12:07:19.4	20	-5	-517
onoff stat: 1	3	12:07:20.4	20	-4	-469
onoff stat: 1	4	12:07:21.4	20	-3	-419
onoff stat: 1	5	12:07:22.4	20	-3	-367
onoff stat: 1	6	12:07:23.4	20	-2	-315
onoff stat: 1	7	12:07:24.4	20	-1	-261
onoff stat: 1	8	12:07:25.4	20	-0	-207
onoff stat: 1	9	12:07:26.4	20	1	-152
onoff stat: 1	10	12:07:27.4	20	2	-100
onoff stat: 1	11	12:07:28.4	20	3	-44
onoff stat: 1	12	12:07:29.4	20	3	9
onoff stat: 1	13	12:07:30.4	20	4	61
onoff stat: 1	14	12:07:31.4	20	5	112
onoff stat: 1	15	12:07:32.4	20	6	160
generator scan ['5b2b37a4'] (scan num: 1)					

## Different distances

	seq_num	time	motor_readback	psu_current_RB	gaussmtr_readback
	1	12:03:10.7	-0	5	153
	2	12:03:13.1	1	5	152
	3	12:03:15.5	2	5	152
	4	12:03:17.9	3	5	152
	5	12:03:20.3	4	5	153
	6	12:03:22.7	5	5	153
	7	12:03:25.1	6	5	154
	8	12:03:27.5	7	5	153
	9	12:03:29.9	8	5	154
	10	12:03:32.3	9	5	154
	11	12:03:34.7	10	5	155
	12	12:03:37.1	11	5	154
	13	12:03:39.5	12	5	155
	14	12:03:41.9	13	5	154
	15	12:03:44.3	14	5	155
	16	12:03:46.7	15	5	155
	17	12:03:49.1	16	5	156
	18	12:03:51.5	17	5	155
	19	12:03:53.9	18	5	156
	20	12:03:56.3	19	5	155
	21	12:03:58.7	20	5	156
generator scan ['a9a87448'] (scan num: 1)					



# Thanks for your attention

