# Magnetic field measurements of SP-41 dipole magnet

## Experiment BM@N

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**BM@N workshop, JINR LHEP**

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# Contents

# Magnetic field Cartographer

Figure: Sergey Alexeevich Dolgy
and his machine for magnetic fields measurements

# Carriege mechanics

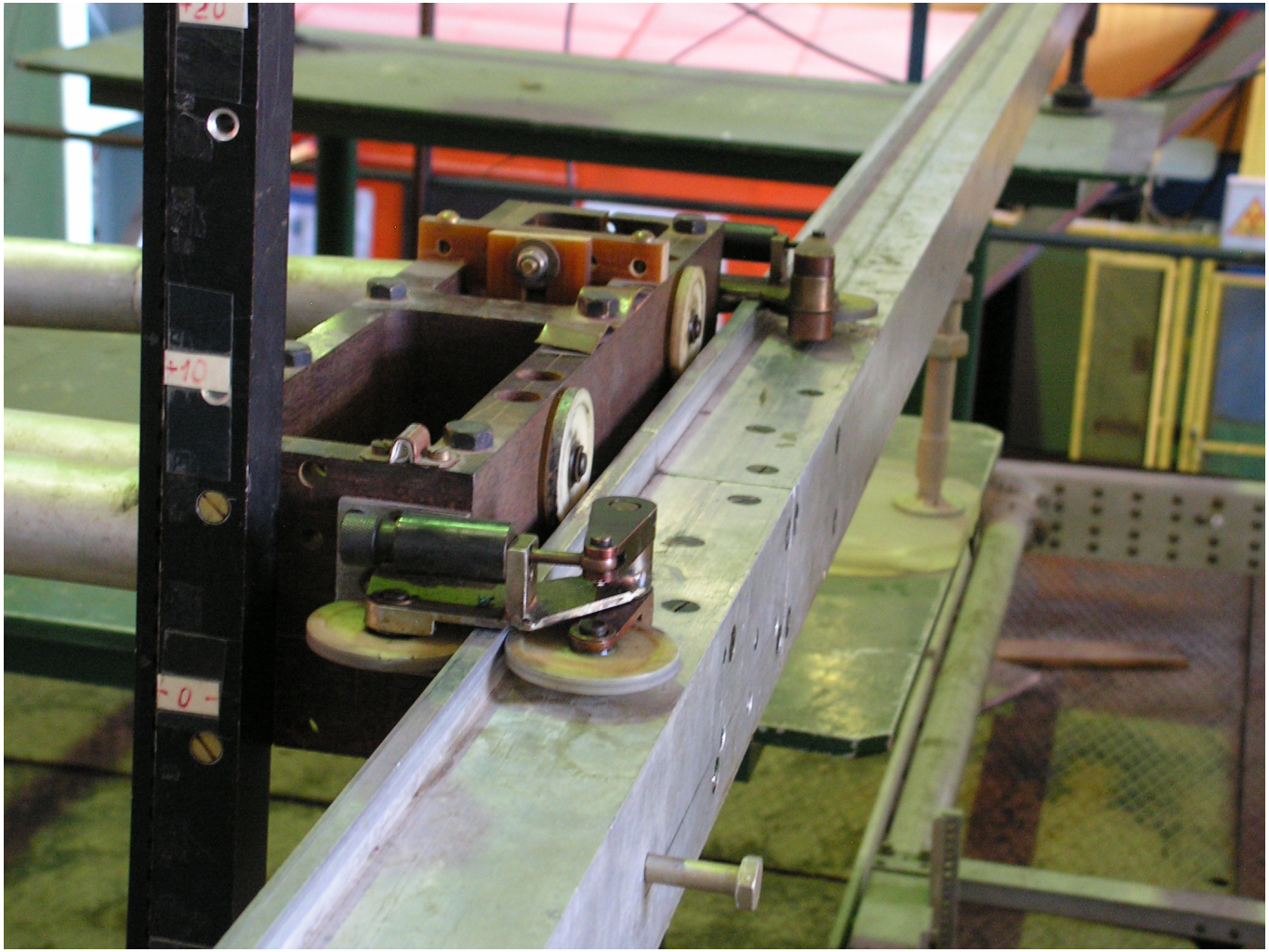
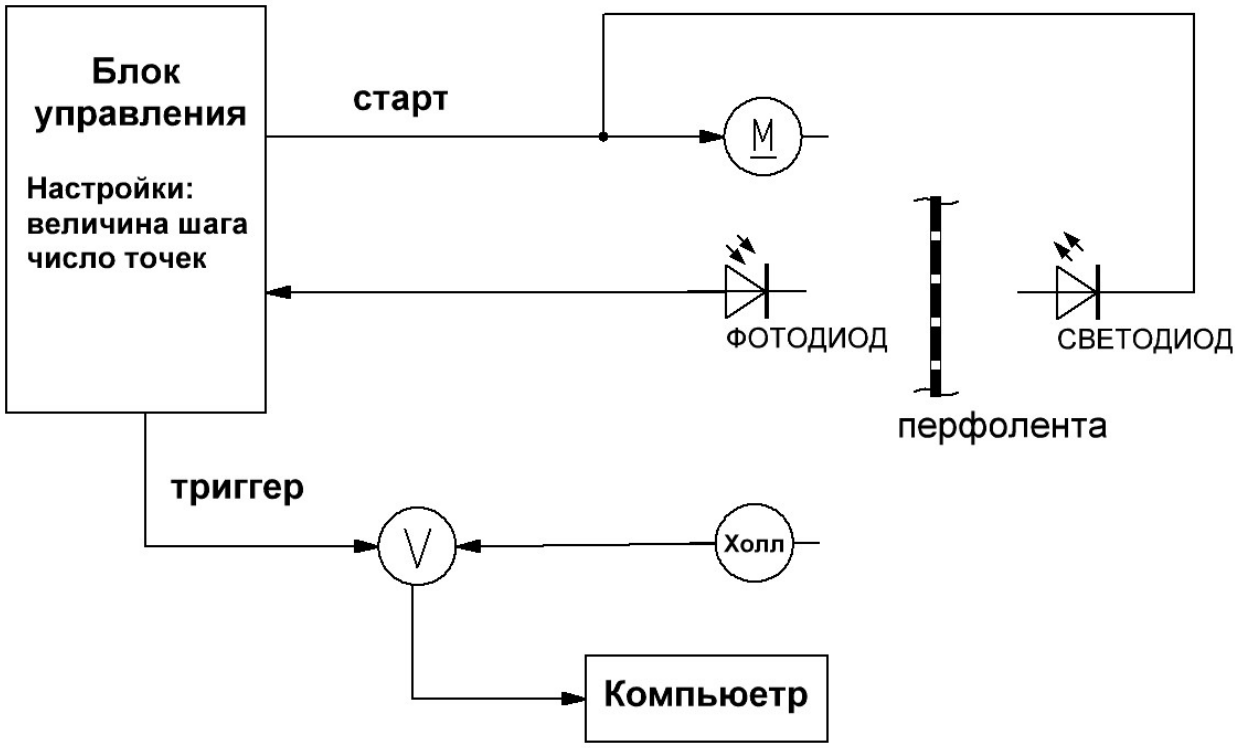


Figure: Mechanics of moving along the 5 meters rails

# Manage schem



# Position reader

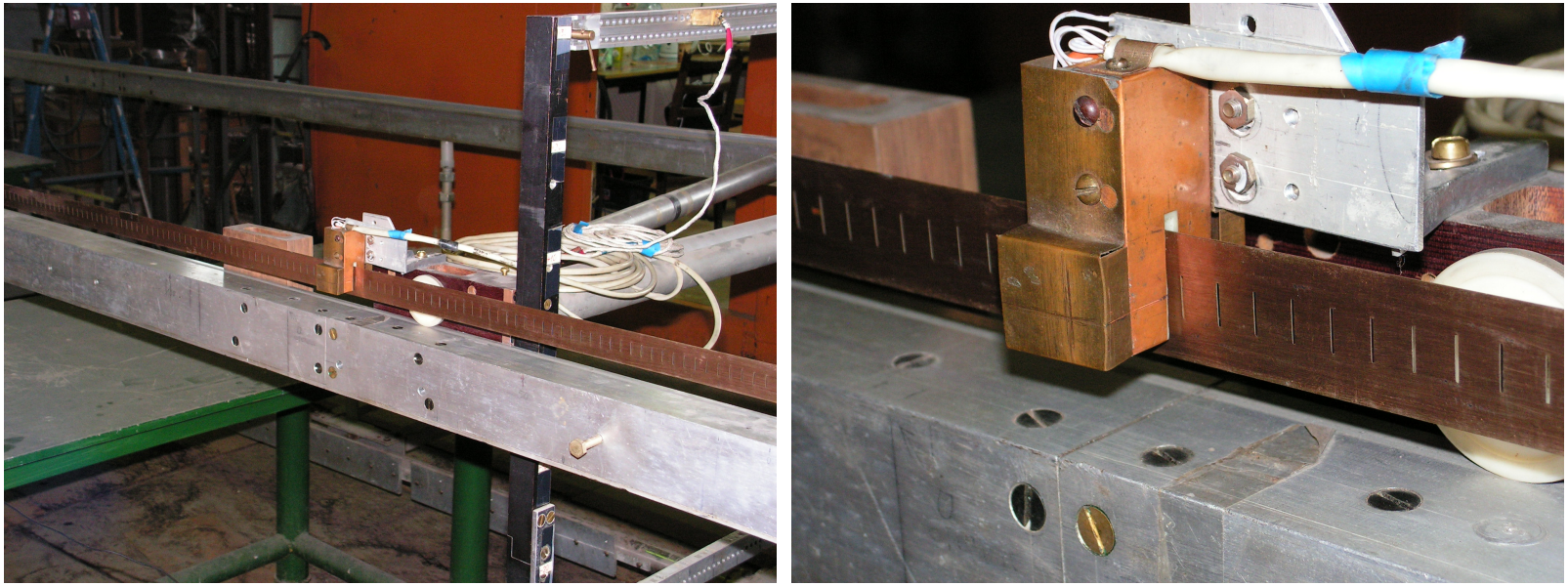
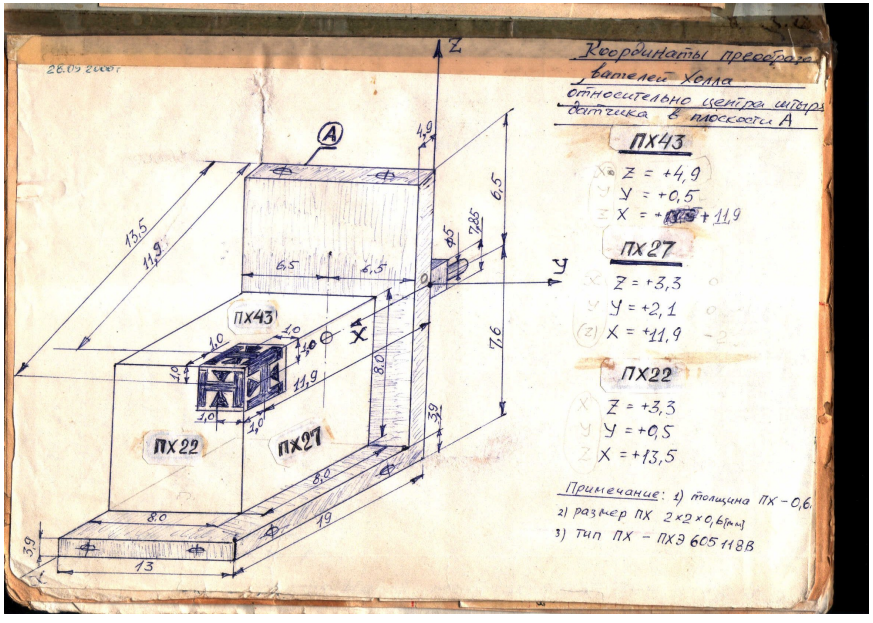


Figure: Trigger is generated by the LED-reader and perforated tape

# 3D Hall sensor



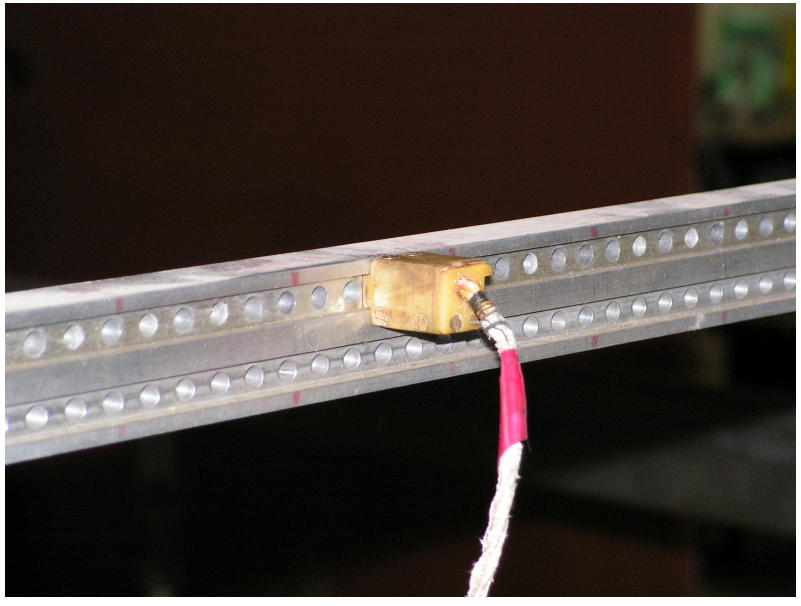
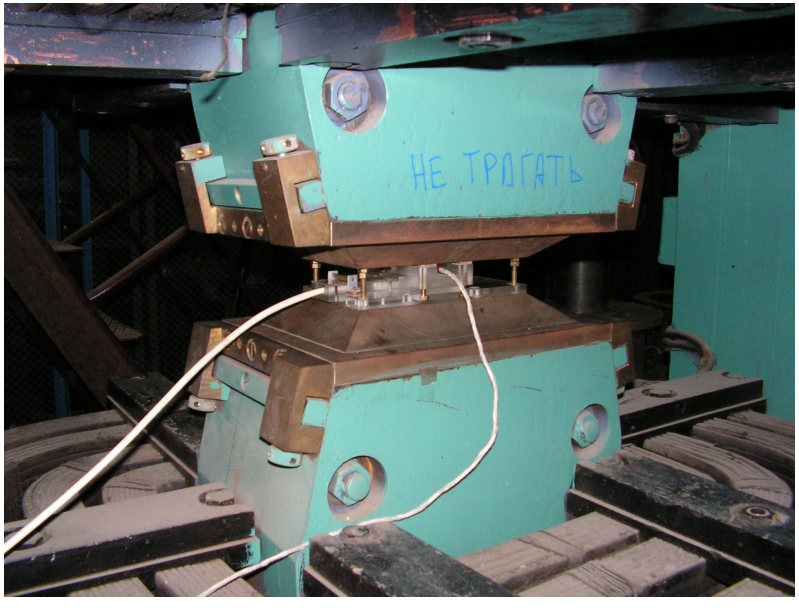



Figure: Shcem of Hall-probs incorporated to 3D-sensor
which is shown in its working position

# Calibration factory



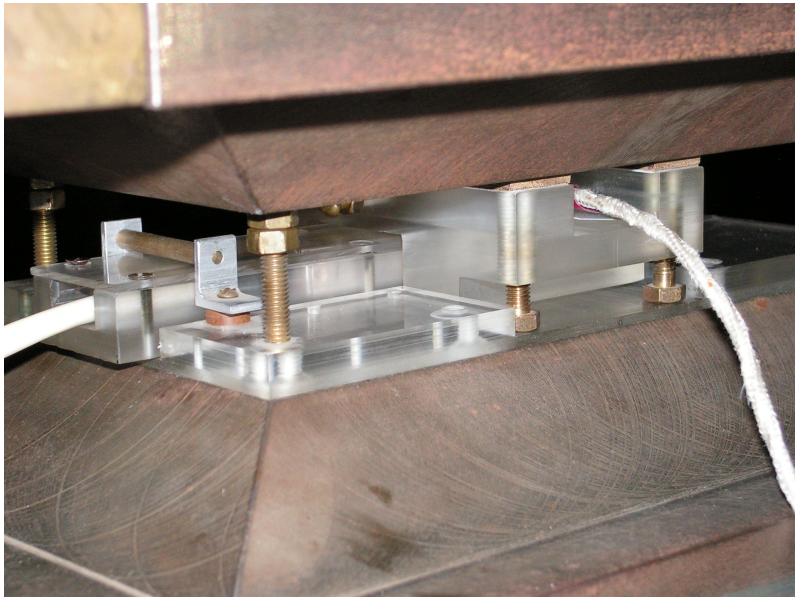



Figure: Calibration magnet up to 2 Tesla
Plastic box for NMR-cell and Hall-sensor fastening

# Calibration factory

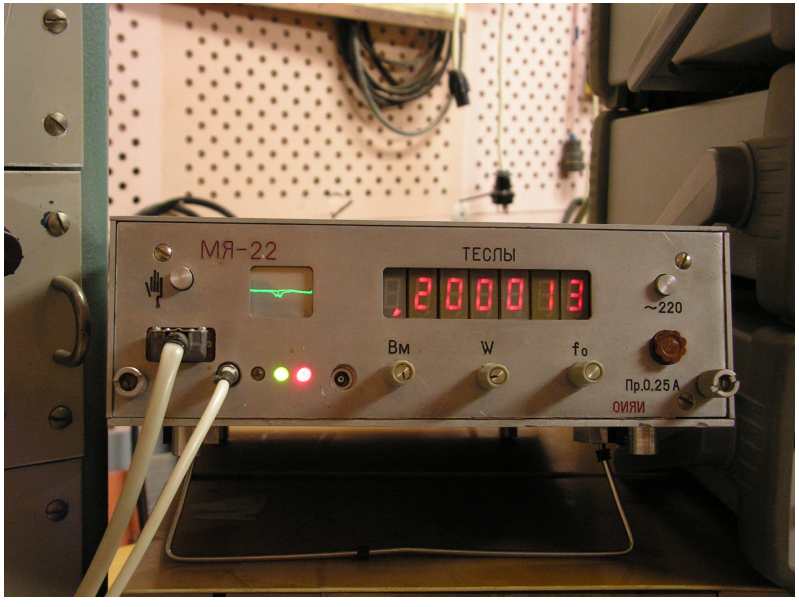



Figure: Wide-range JINR magnetometer МЯ-22
Sergey Dolgyi during of Hall-probs operation

# 3D-sensor calibration

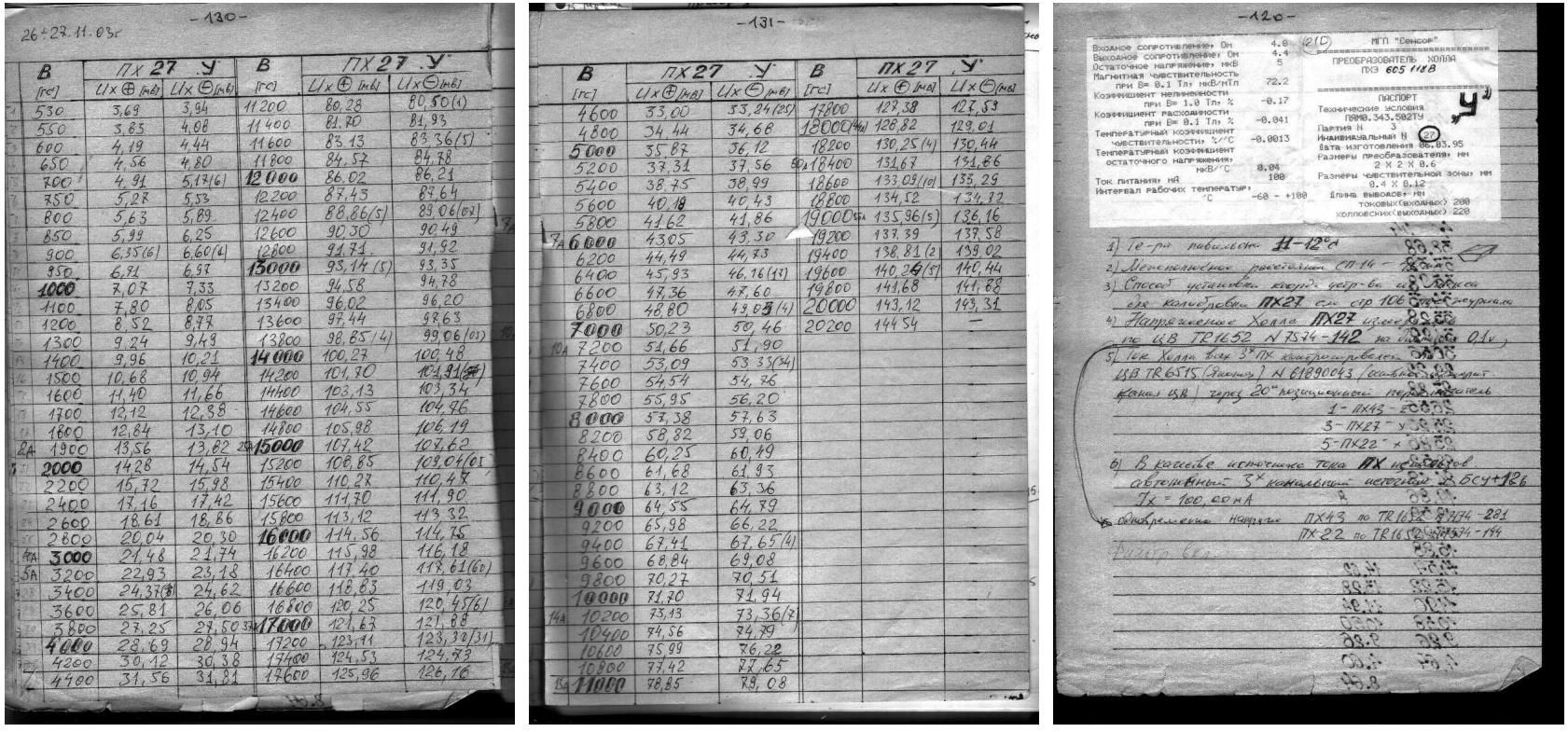


Figure: Example of ПХ27 Hall-sensor calibration in 2016

# 3D-sensor calibration

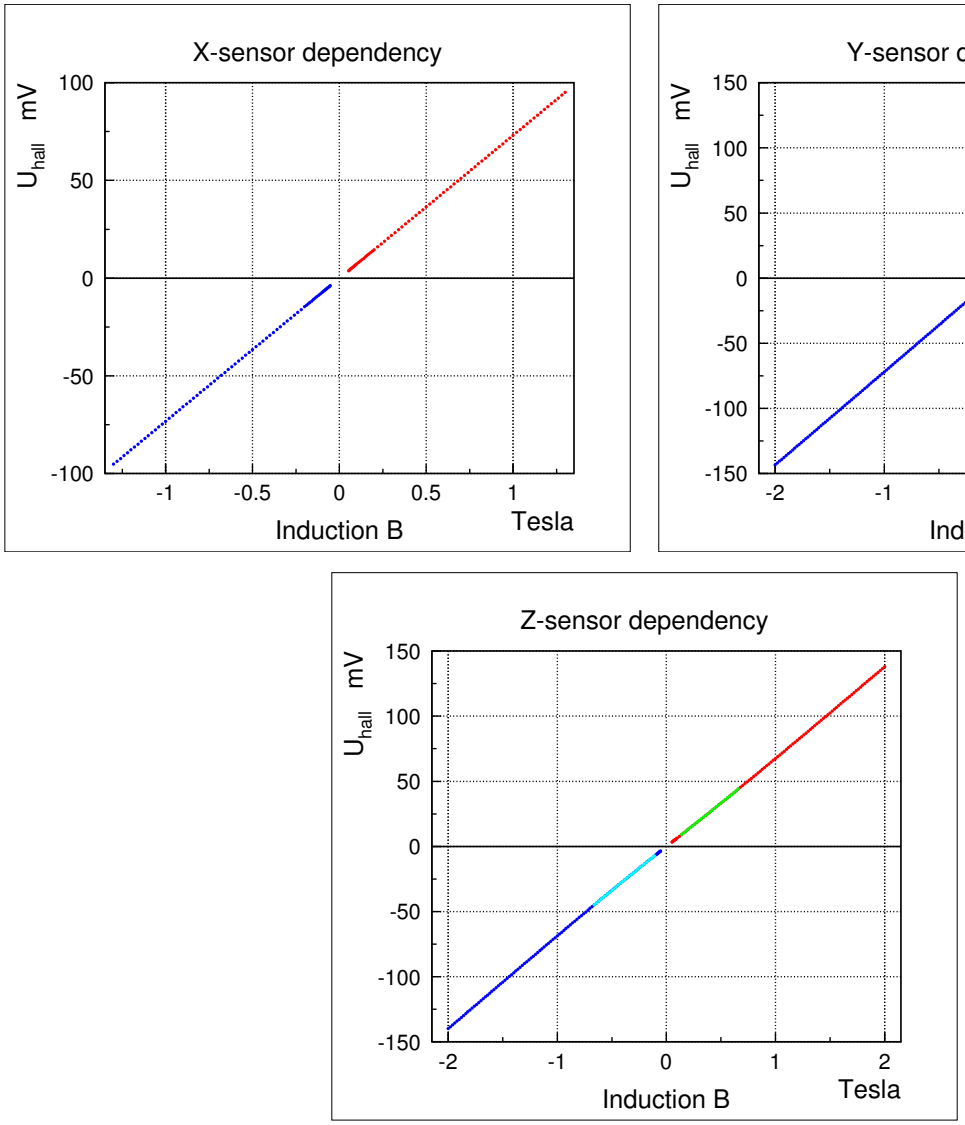



Figure: Hall-probs magnetic dependensies

# Monitor prob & magnetic hysteresis of SP-41

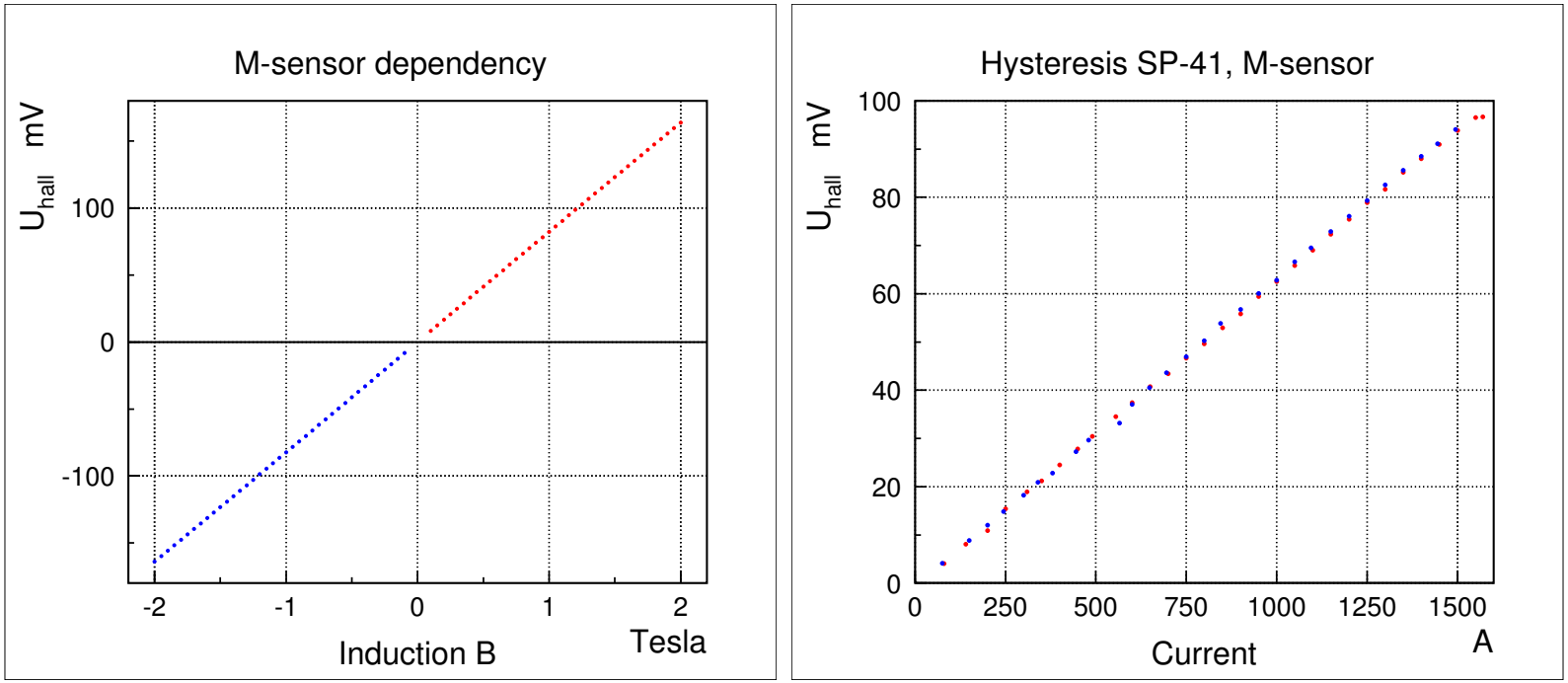



Figure: Monitor-sensor 2016 calibration
and magnetic hysteresis dependency of SP-41 dipole

# Towards to measurements 2016

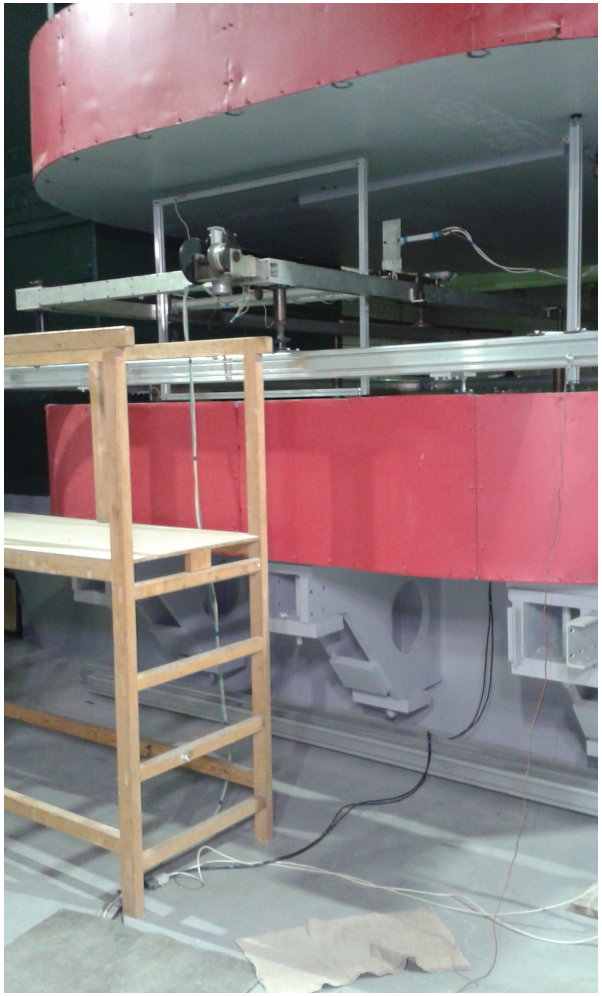


Figure: View to magnetic machine inside the SP-41 magnet
controll electronics and high precision current sources

# Towards to measurements 2016


Figure: Magnetic machine inside the SP-41
and moving platform to change its position

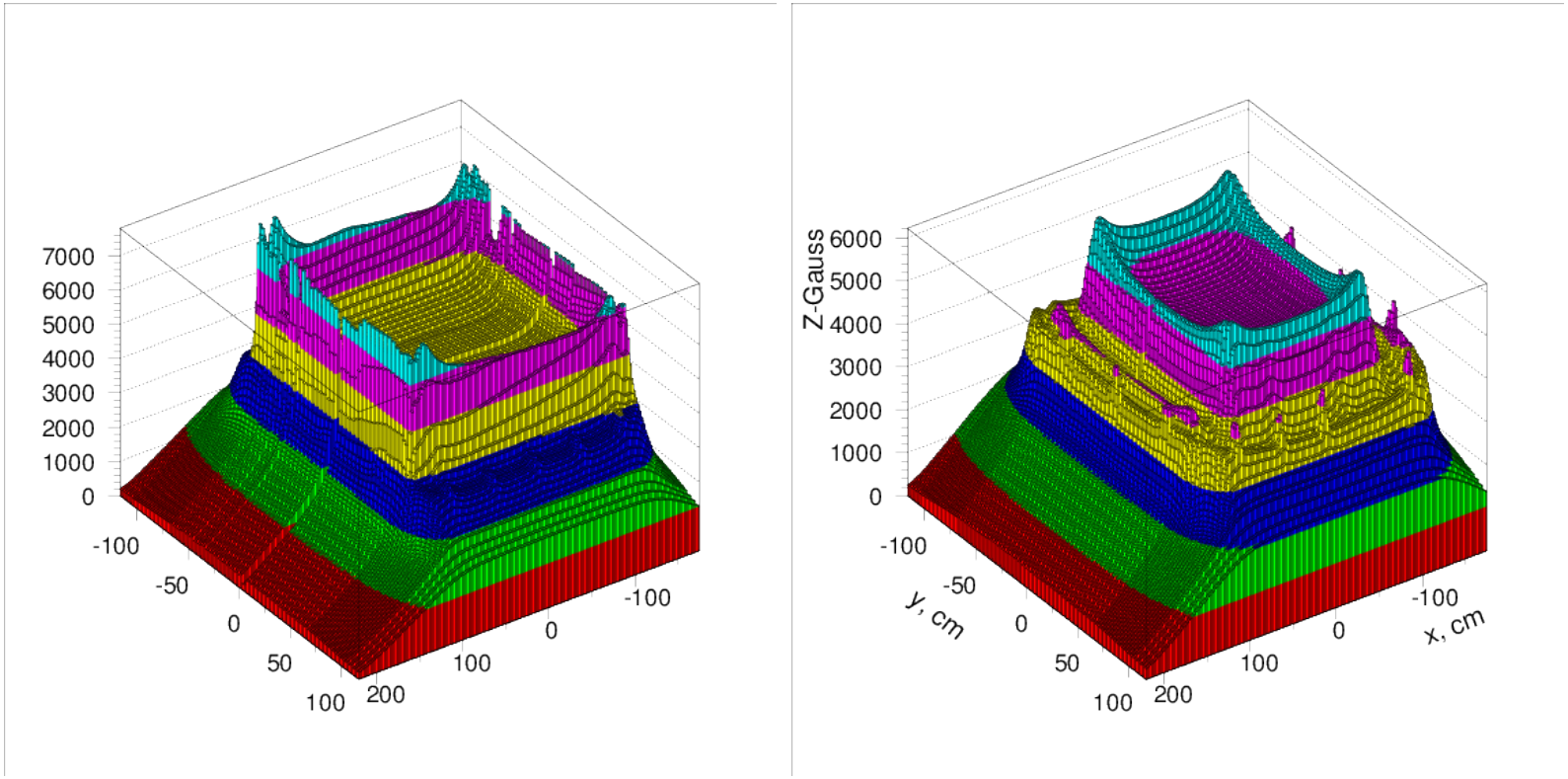
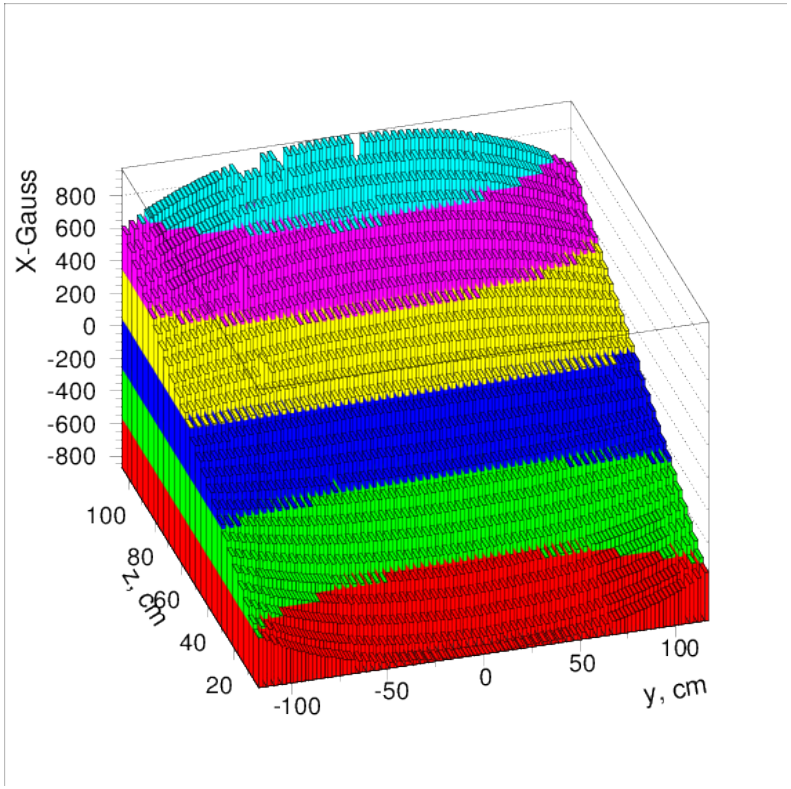
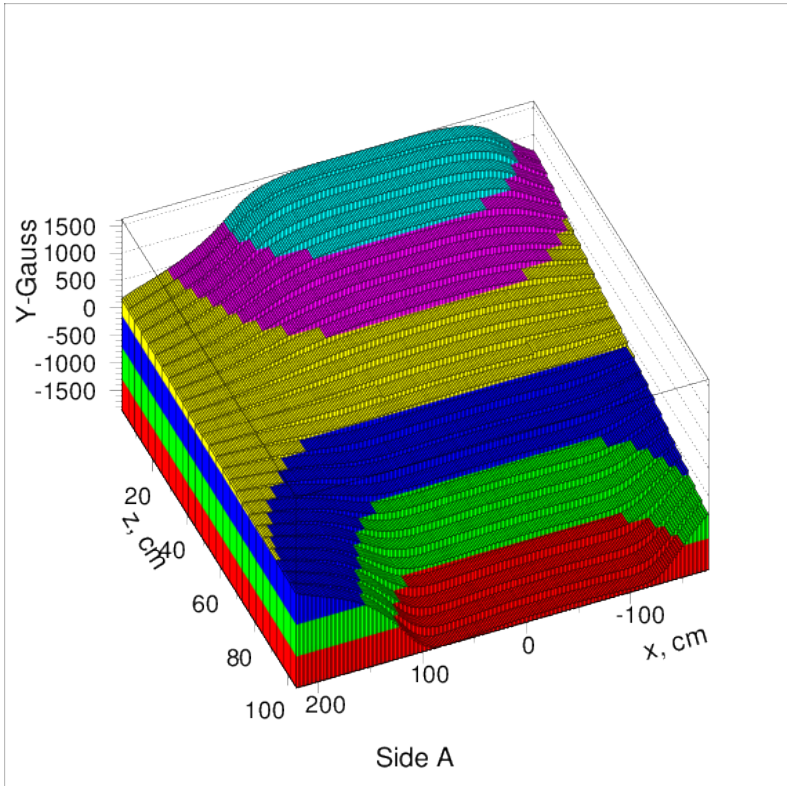



Figure: $B_z$ projection nearby the down and top poluses

# $B_x$ & $B_y$


X-Gauss
800
600
400
200
0
-200
-400
-600
-800
100
80
60
40
20
z, cm
-100
-50
0
50
100
y, cm


Y-Gauss
1500
1000
500
0
-500
-1000
-1500
20
40
60
80
100
z, cm
200
100
0
-100
x, cm
Side A

# Wide and more long frames

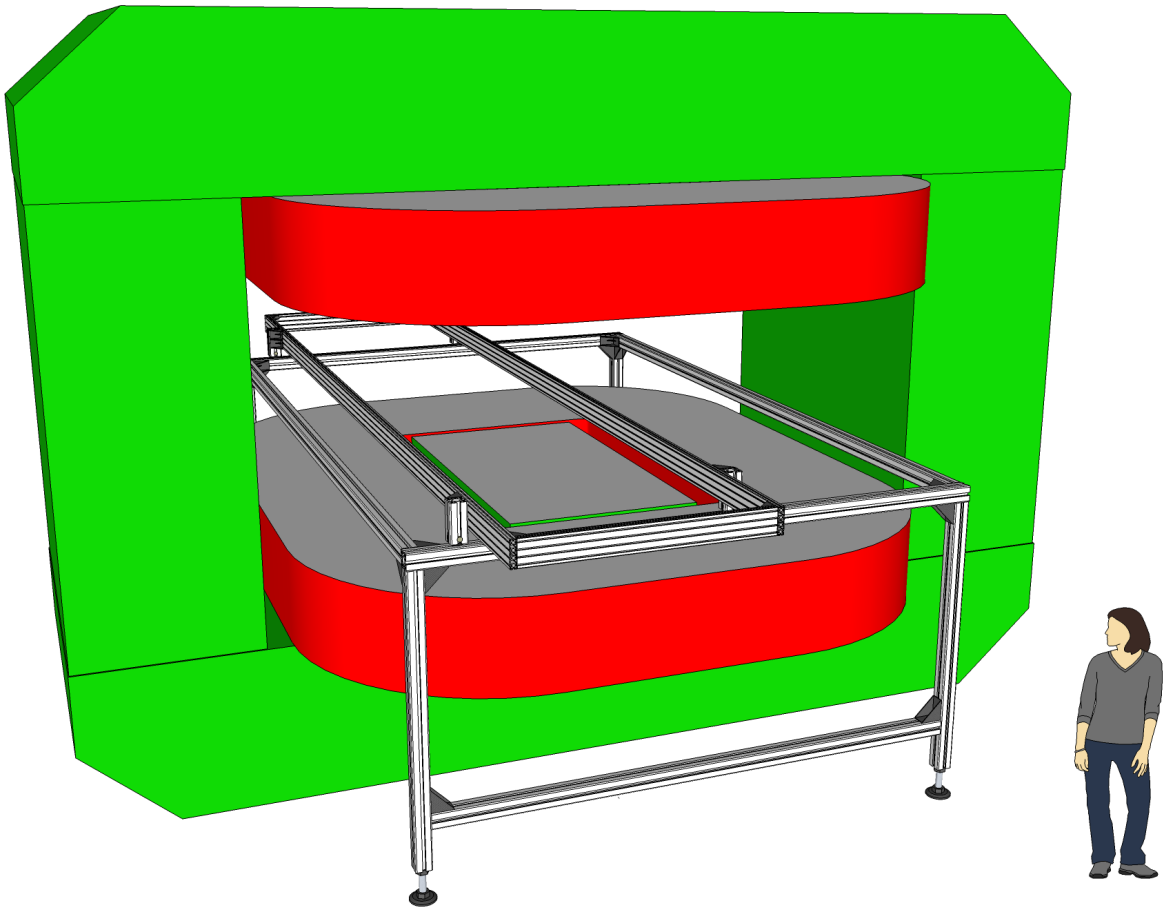


Figure: Length 7m, Width 3m

# Collaboration


Figure: Pelcom Dubna Machine-building factory

# Durable & Precision

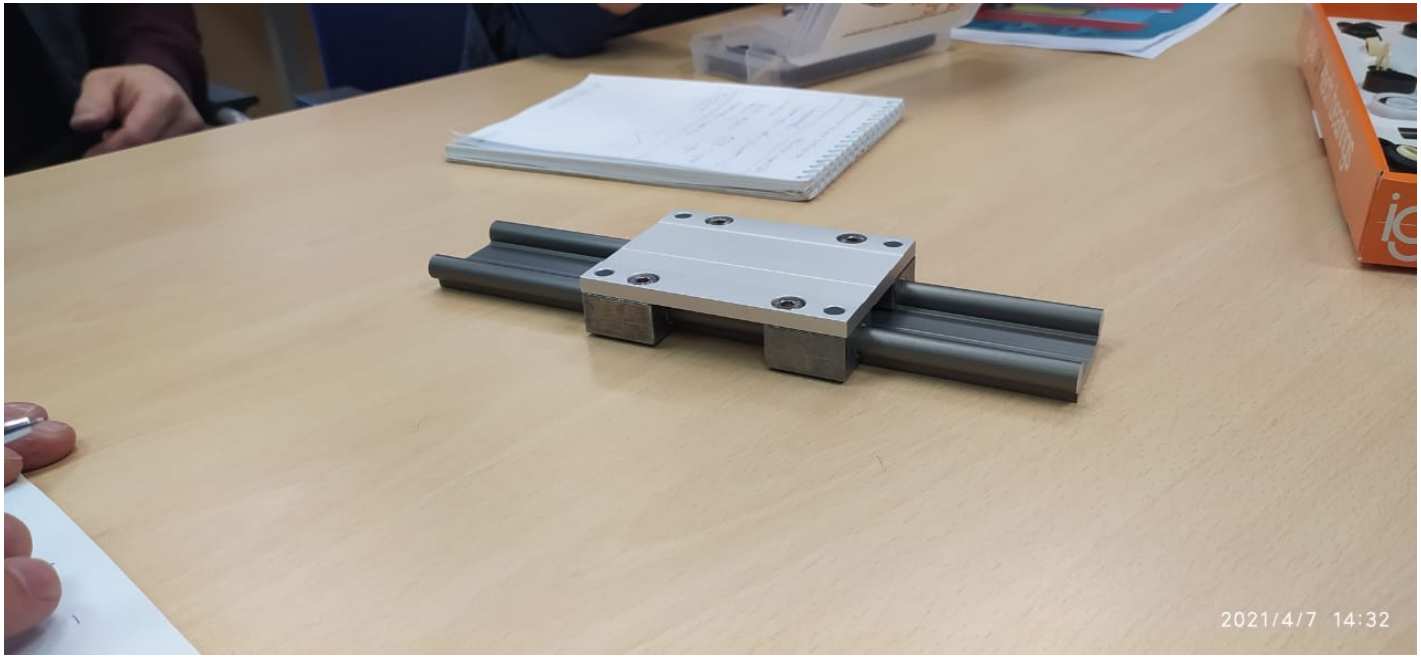
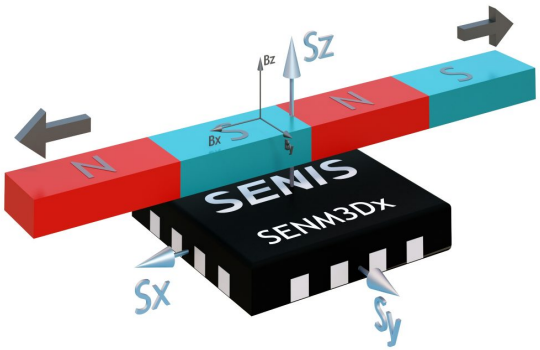



Figure: Double rails frame with carriege

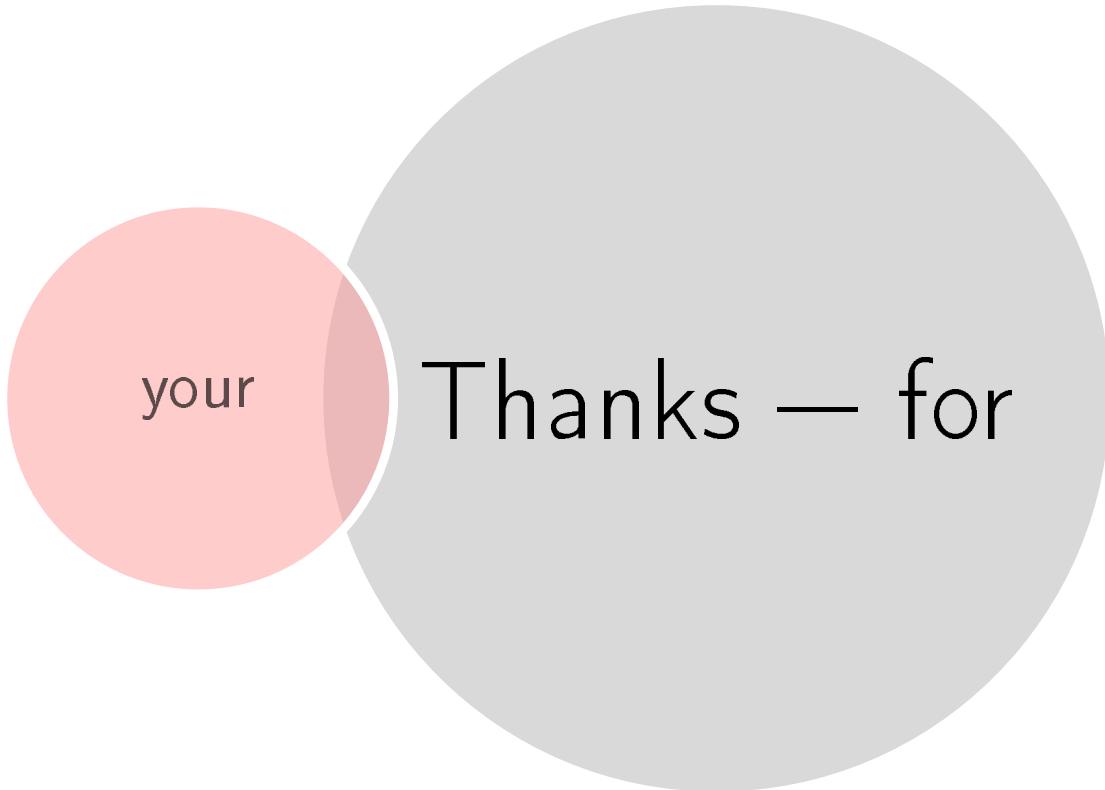
# Senis production





1. 3-axis Hall probes
2. High measurement range: 20mT to 20T
3. High magnetic resolution: $<$ 1uT
4. High linearity: $<$ 0.05%
5. f-bandwidth DC - 75kHz
6. Temperature: -40°C to 155°C

Thanks — for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