

# Magnetic field measurement, inside the $\mu$ -Veto taken on the 19.07.2024

Nicolas Sierra Manrique

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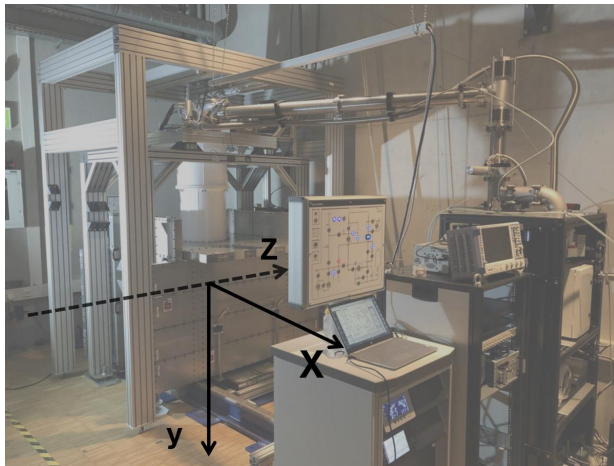
## 1. Introduction

The instrument used for these measurements was the Mag-13MS100 from Bartington Instruments, as shown in Figure 1.



**Figure 1.** Magnetic field coordinate system from the detector in relation to the LAB.

The magnetometer measures the magnetic field along three perpendicular axes. The detector was arranged so that its axes correspond to those shown in Figure 2.



**Figure 2.** Magnetic field coordinate system from the detector in relation to the LAB.

## 2. Magnetic Field Measurement with Varying $\mu$ -Veto Gaps

The magnetic field along the x, y, and z axes was measured at 10 different distances between the right and left sections of the  $\mu$ -Veto, referred to as gaps. These measurements are plotted as a function of gap distance and are presented in Figure 3.

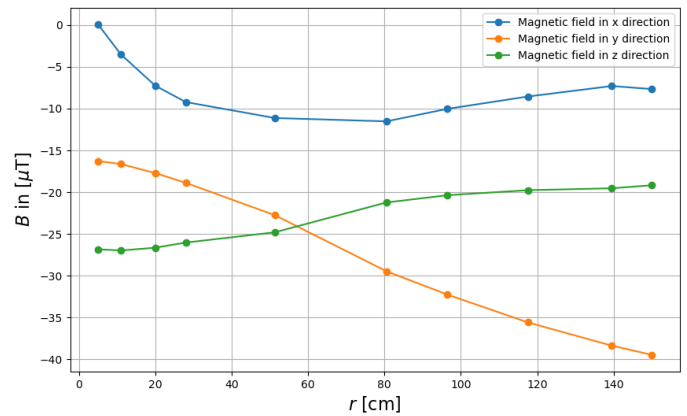
The magnetic field magnitude increased in the x and y directions, but it was reduced in the z-direction

**Table 1.** Magnitude of the magnetic field with  $\mu$ -Veto closed and open with  $\Delta = \text{Gap}(150 \text{ cm}) - \text{Gap}(5 \text{ cm})$

	Gap=5cm [ $\mu$ T]	Gap=150 cm [ $\mu$ T]	$\Delta$ [ $\mu$ T]
<b>X</b>	0,08	7,7	7,6
<b>Y</b>	16,3	39,5	23,2
<b>Z</b>	26,9	19,2	-7,7
<b>  B  </b>	31.4	44,6	25.6

**Table 2.** Magnitude of the magnetic field with  $\mu$ -Veto with only one side open

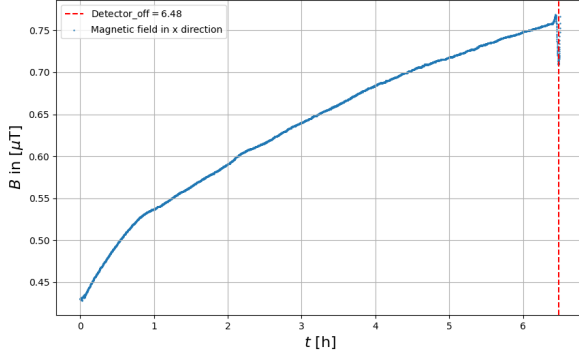
	Right [ $\mu$ T]	Left [ $\mu$ T]
<b>X</b>	-4,8	-10,37
<b>Y</b>	-22,36	-32,10
<b>Z</b>	-30,87	-13,47
<b>  B  </b>	38.4	36.32



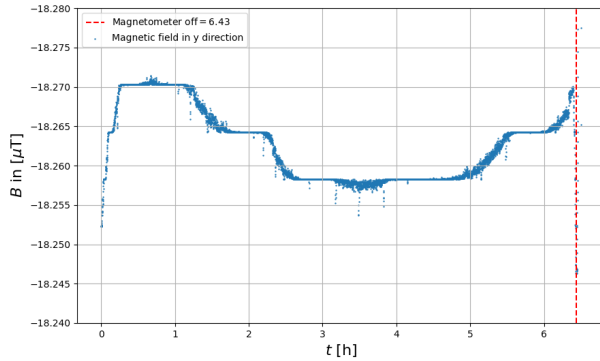
**Figure 3.** Magnetic Field vs. Gap Distance in the x (blue), y (yellow), and z (green) Directions

### 3. Magnetic Field with $\mu$ -Veto closed

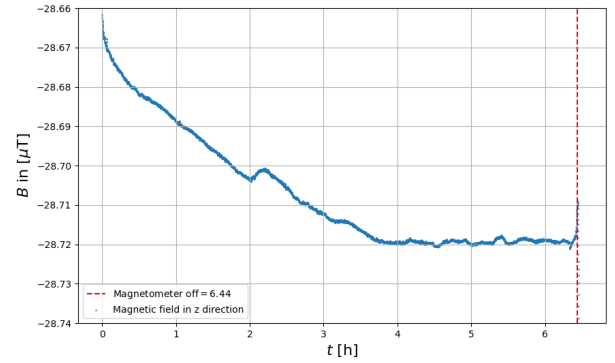
The magnetometer was mounted at the bottom of the closed cryostat. Due to technical constraints, the  $\mu$ -veto remained partially open, leaving a 4 cm gap. The magnetometer has a sample rate of 10,000 values per second. In the figures presented in this chapter, each point is given for 3 seconds; it represents the average of every 30,000 values. The magnetometer measured from Friday evening and operated for approximately 6 hours and 30 minutes until the battery was empty and turned off. The red dotted line in the figure indicates this shutdown.



**Figure 4.** Magnetic field in the x direction, magnetometer in balanced mode, with one value equal to 3 seconds. (Average of 30,000 data points)



**Figure 5.** Magnetic field in the y direction, magnetometer in balanced mode, with one value equal to 3 seconds. (Average of 30,000 data points)



**Figure 6.** Magnetic field in the z direction, magnetometer in balanced mode, with one value equal to 3 seconds. (Average of 30,000 data points)