

Long-Term Measurements of the SENIS Hall Probe in a Magnetic Zero Field Chamber

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Measurement Setup

Digital Voltmeter: NI PXI 4071 (National Instruments)

- Resolution: 7,5 digits
- Aperture : 200ms
- Measurement Cycle: 1s
- Measuring Time: 24 hours

General Conditions

The Hall Probe was placed in a Magnetic-Zero-Field-Chamber in an air-conditioned laboratory.

The measurements (Bx, By, Bz) have been performed on three consecutive working days. Electromagnetic interferences in the environment were expected, for example by handlings of the overhead crane.

Analysis

The 24 hour data sets were divided in distributions of "one hour quantities" and each mean value and standard deviation determined and plotted.

Results

During 24-hour data taking were obtained for the given measurement setup the following signal behavior of the Magnetic-Zero-Field-Noise Distribution:

- 1-3 μT drift for the mean value and
- $\sim 1 \mu\text{T}$ constant standard deviation.

This is an excellent result for our purposes.

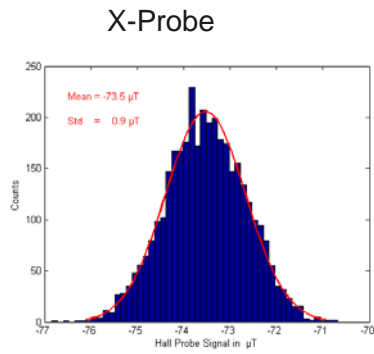


Figure 1: Noise Distribution after first hour

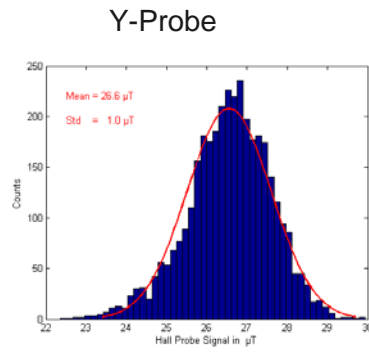


Figure 4: Noise Distribution after first hour

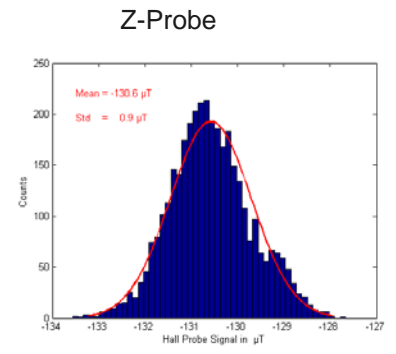


Figure 7: Noise Distribution after first hour

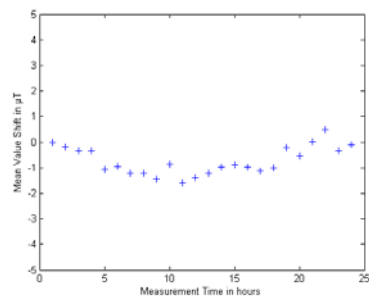


Figure 2: Mean Value drift during 24 hours

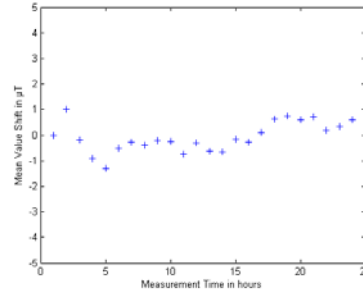


Figure 5: Mean Value drift during 24 hours

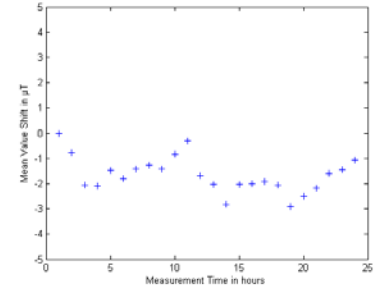


Figure 8: Mean Value drift during 24 hours

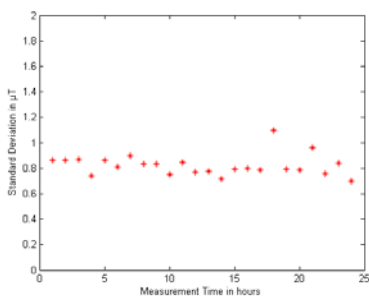


Figure 3: Standard Deviation during 24 hours

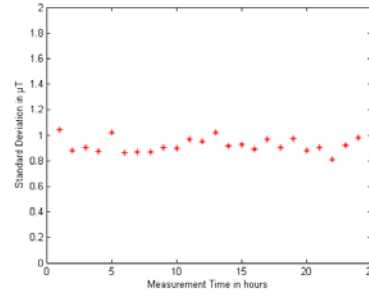


Figure 6: Standard Deviation during 24 hours

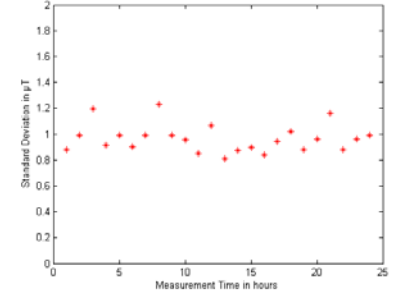


Figure 9: Standard Deviation during 24 hours