

Leakage magnetic field measurement on April 22, 2026

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Abstract

SAMURAI leakage field measurement using a Hall probe was repeated in the same configuration as before. Basic feature of the previous measurement was confirmed. The data from this study captures the behavior of the leakage magnetic field in some greater detail.

1 Leakage field measurement

During the excitation of the SAMURAI magnet on April 22, 2026, the leakage magnetic field measurement was conducted as before [1]. The Hall probe was placed near the lower PMT of a HIME vertical module placed at the highest momentum side. More specifically, the tip of the Hall probe was located at around 32.5 cm measured from the outer edge of the HIME veto frame (Fig. 1). The rotation angle of the probe was tuned at the 2 T excitation so that the measured field value reaches the maximum.

2 Results

Figure 2 depicts the leakage field measured using the Hall probe near the lower PMT position of a HIME module located at the high-momentum side (red line). One can observe the following points:

- Basic feature of the previous measurement was reproduced.
- During the decent of the magnetic field, it was found that the leakage magnetic field right after the steady excitation current (of SAMURAI) is reached increases gradually by some amount (at the 2.8 T excitation such a recovery of the field was unnoticed).

Figure 3 shows the time variation of the measured stray magnetic field. Raw data of the current measurement are shown in Appendix A.

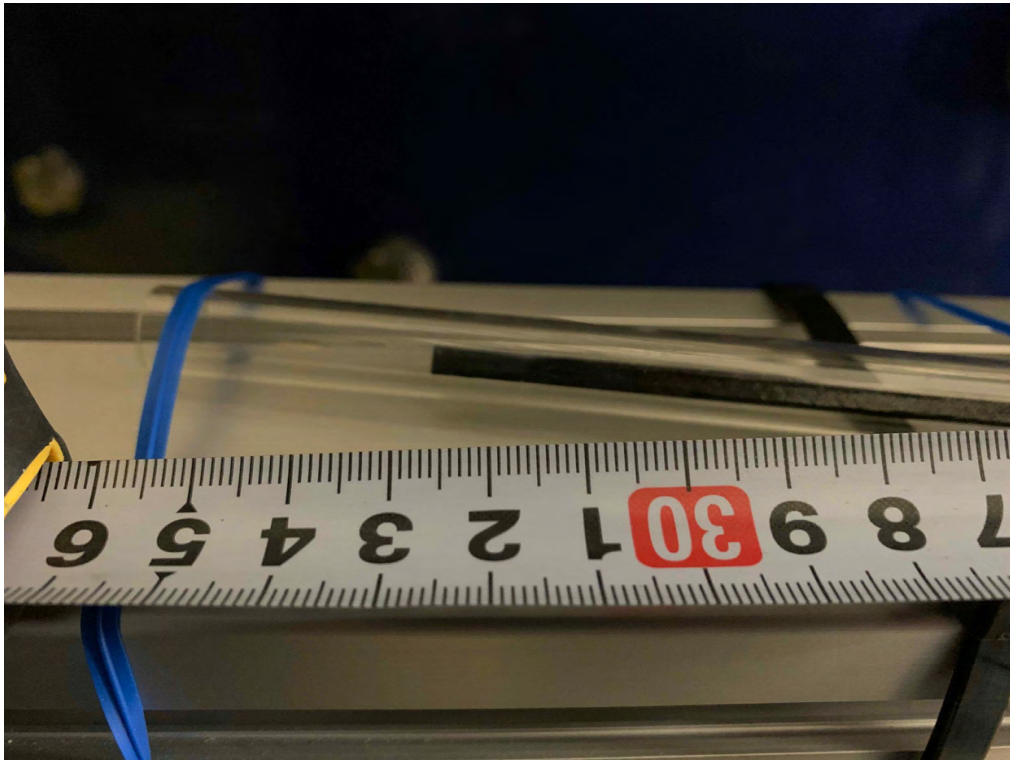


Figure 1: A Hall probe was placed near the lower PMT of a vertical HIME module at the higher momentum side. Tip of the probe was located at ~ 32.5 cm from the outer edge of the HIME veto frame.

A Raw data

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time,field[T],strayfield[mT]
2026-04-22 12:06,2.0,0.331
2026-04-22 12:29,2.5,0.856
2026-04-22 12:40,2.7,1.177
2026-04-22 12:52,2.9,1.916
2026-04-22 13:15,2.9,1.808
2026-04-22 14:18,2.9,1.808
2026-04-22 14:45,2.8,1.169
2026-04-22 15:09,2.7,0.792
2026-04-22 15:27,2.7,0.821
2026-04-22 15:45,2.5,0.398
2026-04-22 15:58,2.5,0.475
2026-04-22 16:13,2.3,0.186
2026-04-22 16:21,2.3,0.293
2026-04-22 16:39,2.1,0.068
2026-04-22 16:50,2.1,0.189
2026-04-22 17:07,1.9,-0.005
2026-04-22 17:18,1.9,0.114
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References

- [1] [Leakage magnetic field measurement on April 14, 2026 \(Sato, Sasano, Kondo, Ikemizu\).](#)

Leak fields at HIME PMT (Hight momentum, Down)

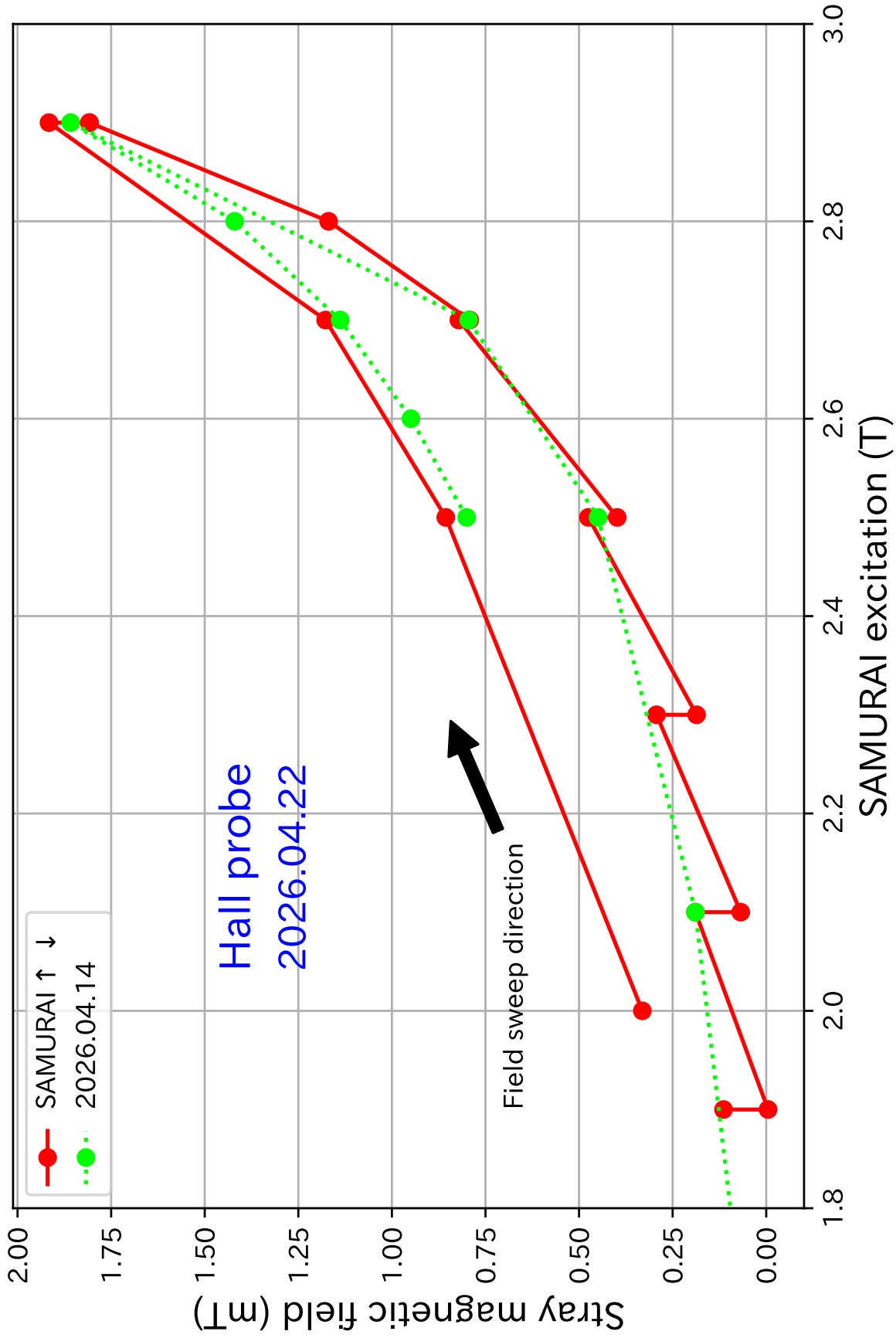


Figure 2: Results of the leakage field measurement carried out using a Hall probe on April 22, 2026 (shown as a solid red line). Earlier results [1] are over-plotted (shown as a dotted green line).

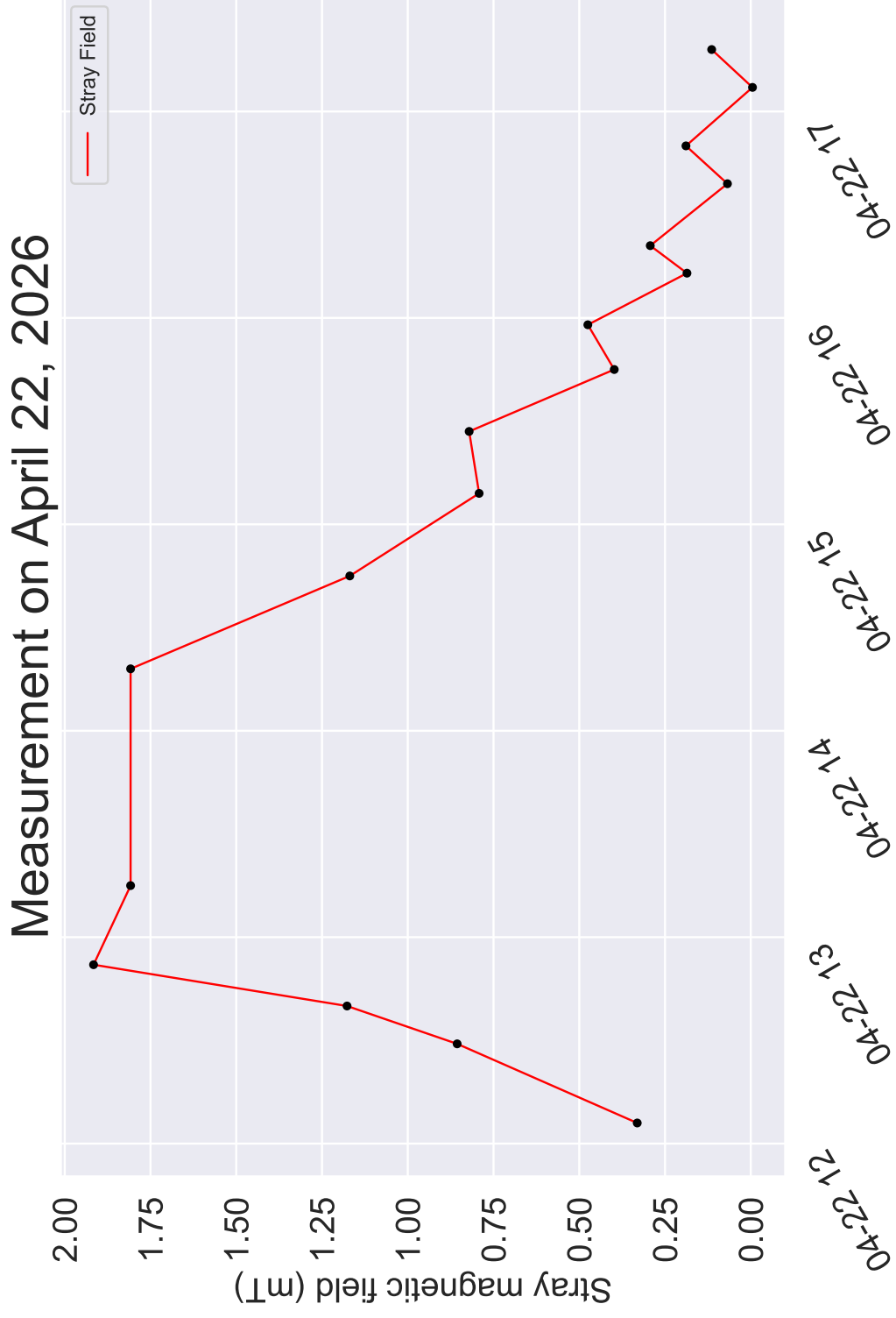


Figure 3: Time variation of the measured stray magnetic field.