

Vibrating sample magnetometry

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In this practical session we will use vibrating sample magnetometry (VSM) for magnetic characterization of ferrimagnetic and metamagnetic materials. VSM gives the possibility to measure magnetic hysteresis as a function of magnetic field or temperature. The advantage is that it measures directly the magnetic moment of the sample, from which the value of magnetization can be determined.

In the introductory part of the session we will discuss the working principle of the instrument and expected magnetic characteristics of the samples that we are going to analyze.

In the experimental part we will

1. Measure magnetic hysteresis of CoTb or CoGd thin films across the magnetization compensation point.
2. Measure the thermal hysteresis of magnetization in a FeRh thin film across the metamagnetic phase transition.

Recommended reading:

- [1] S. Foner, *The vibrating sample magnetometer: Experiences of a volunteer*, J. Appl. Phys. 79, 4740 (1996).
- [2] S. Foner, *Versatile and Sensitive Vibrating-Sample Magnetometer*, Rev. Sci. Instrum. **30** (7), 548–557 (1959).
- [3] <https://www.qdusa.com/products/versalab.html>