

APPLICATION NOTE

Large signal, anisotropic sample measurements in the Lake Shore Model 7410 VSM

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Large signal, anisotropic sample measurements are made possible by the use of a guide tube. This fixture prevents the sample tail from bending due to the pull force and torque exerted on the sample by the applied magnetic field. This is a typical situation for large moment permanent magnet samples. The figures below illustrate the solution designed by Lake Shore to be used with a permanent magnetic sample. This solution enables short measurement time and fast sample replacement in addition to being able to measure larger moment samples. We gratefully acknowledge the help we received from Don Kirk of Magnequench (now Molycorp).

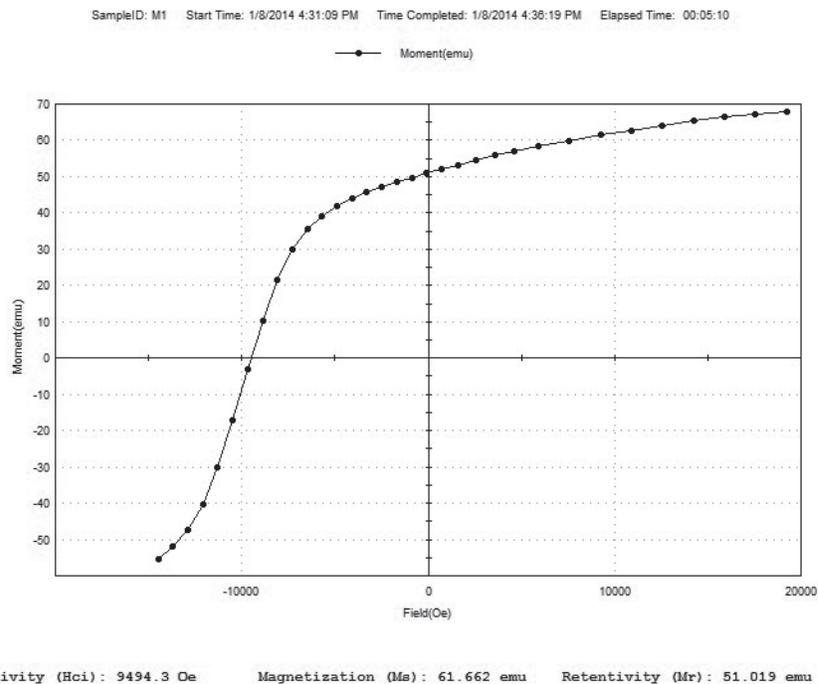


Figure 1—Demagnetizing process for a permanent magnet material sample, as measured with the model 7410 equipped with a guide tube. The notable fact is the ability to measure large moment samples, 50 emu in our case, a typical situation encountered in industry. Without the guide tube, one has to cut the sample down to very small dimensions ($2 \times 2 \times 2$ mm) in order to reduce the magnetic moment and, consequently, the pull force.

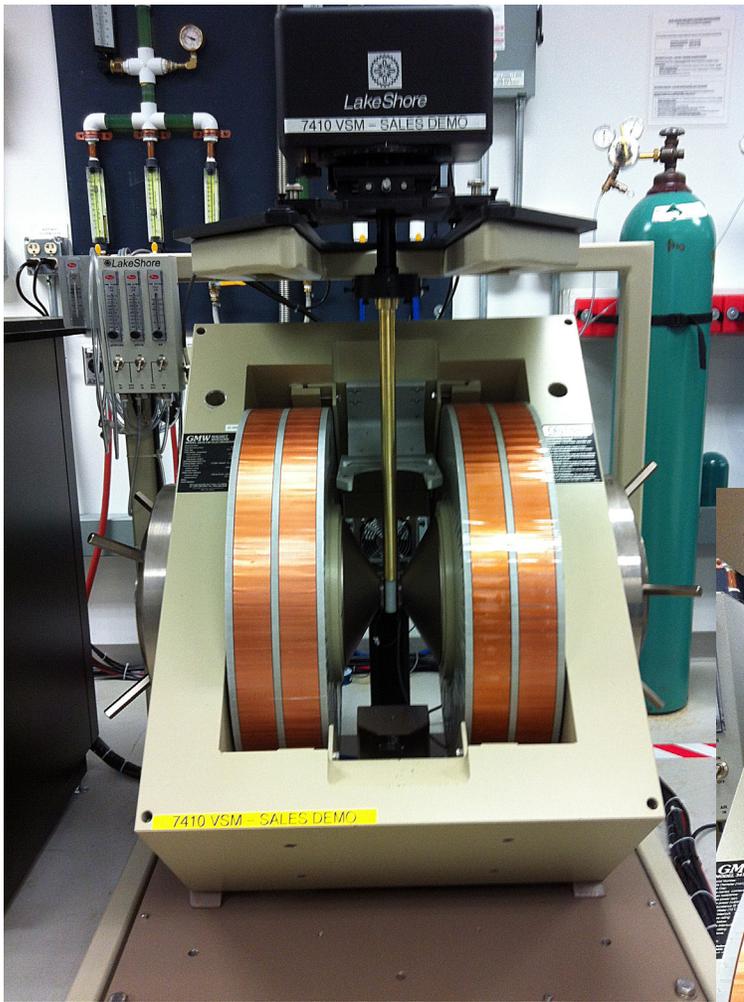


Figure 2—Complete view of the Model 7410 with the guide tube installed. Retrofitting an existing VSM to use this fixture is a simple, 5 minute, straightforward process. Attaching the option directly to the head drive enables us to avoid any increase in measurement noise.

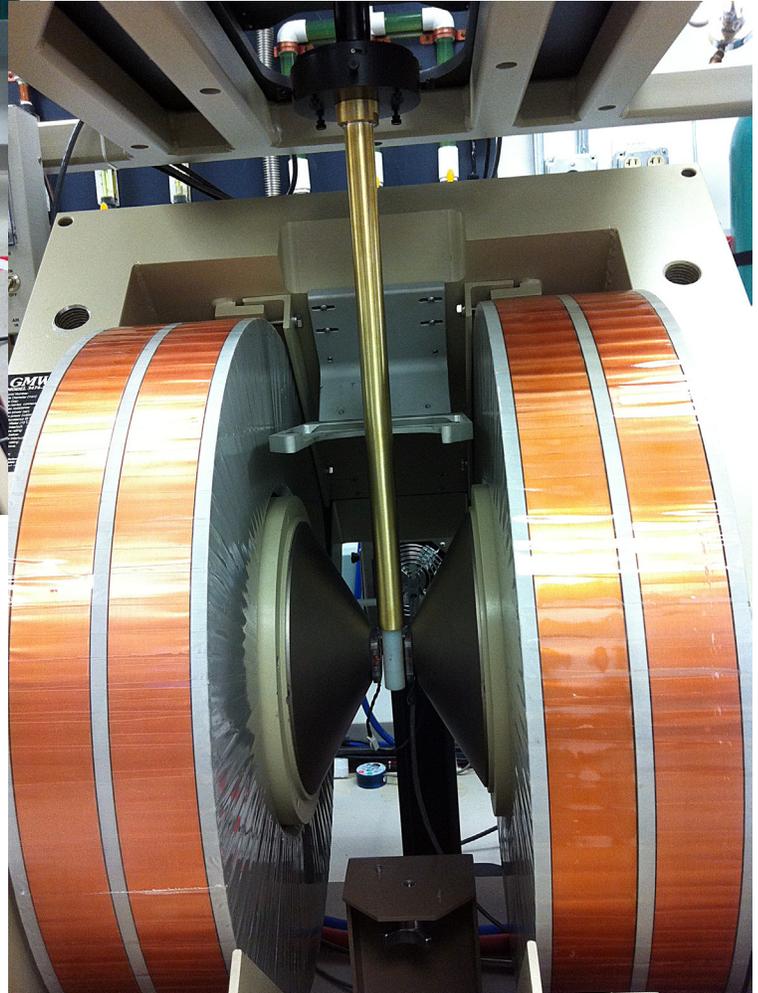


Figure 3—Close-up view of the guide tube and custom sample holder, in measurement position. The holder was provided by Magnequench (currently Molycorp) as part of a common project of developing a VSM option that would enable a Model 7410 user to measure large moment, anisotropic samples. The lower white cylinder represents an ingenious option used by our customer (Magnequench) for quick sample exchange and measurement position reproducibility. This sample holder is just an example of what customers are using but is neither commercialized nor designed by Lake Shore (all rights and patents belong to Magnequench).

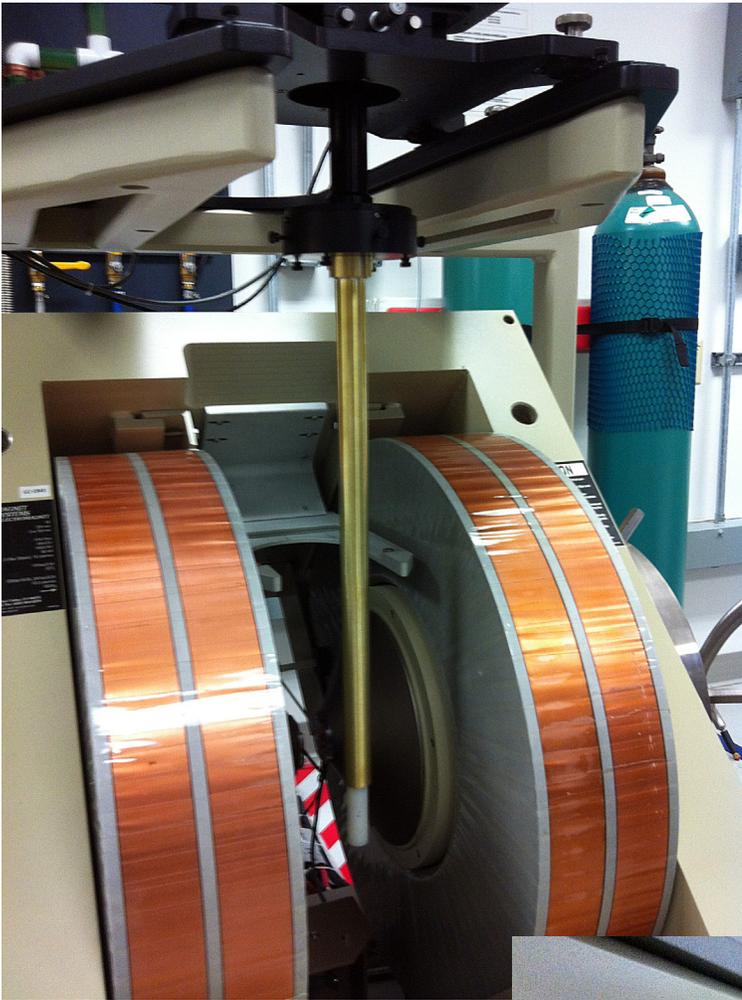


Figure 4—For easy sample replacement, the head slides forward. This is another advantage of attaching the guide tube to the head drive.

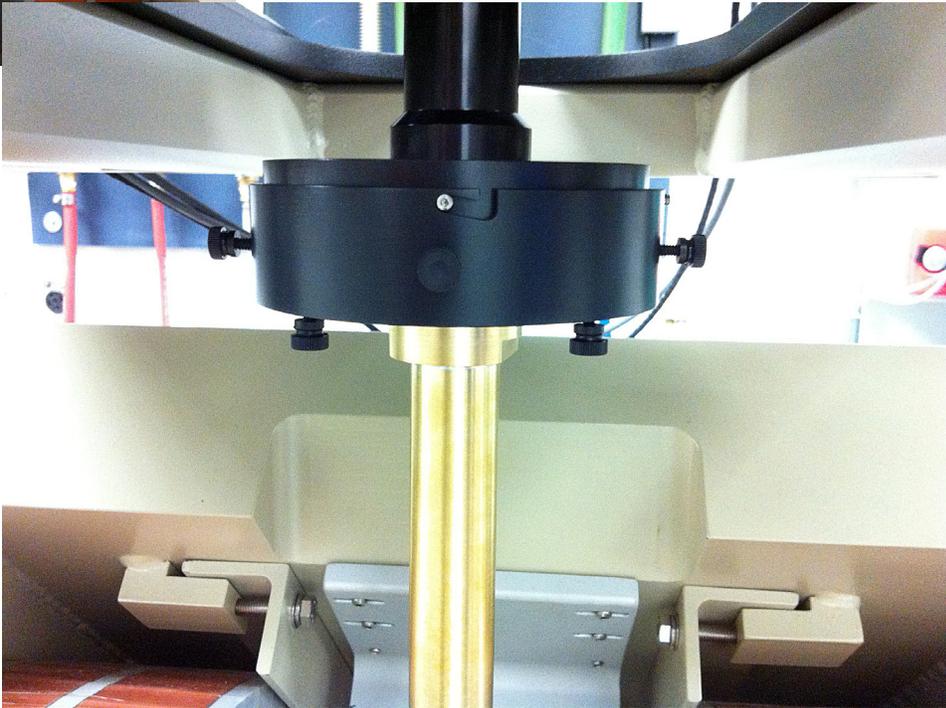


Figure 5—Easy attachment of the option to the head drive.

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