

High-quality Factor Cantilevers with low Moment Magnetic Tips

Operating a standard MFM cantilever in vacuum improves its quality factor from about 100 to a few thousands'. We typically use our UHV multi-source sputtering system to deposit an ultrathin magnetic layer to the backside of the high-aspect ratio tip. Quality factors of about 40'000 are typically obtained, and because the tip has a low magnetic moment such MFM cantilevers have a low stray-field and consequently have only a small influence on the magnetic structure of the sample. Using undisclosed new coating processes, the cantilever quality factor can be improved up to 1'000'000. Ultimate measurement sensitivity is obtained with such cantilevers.

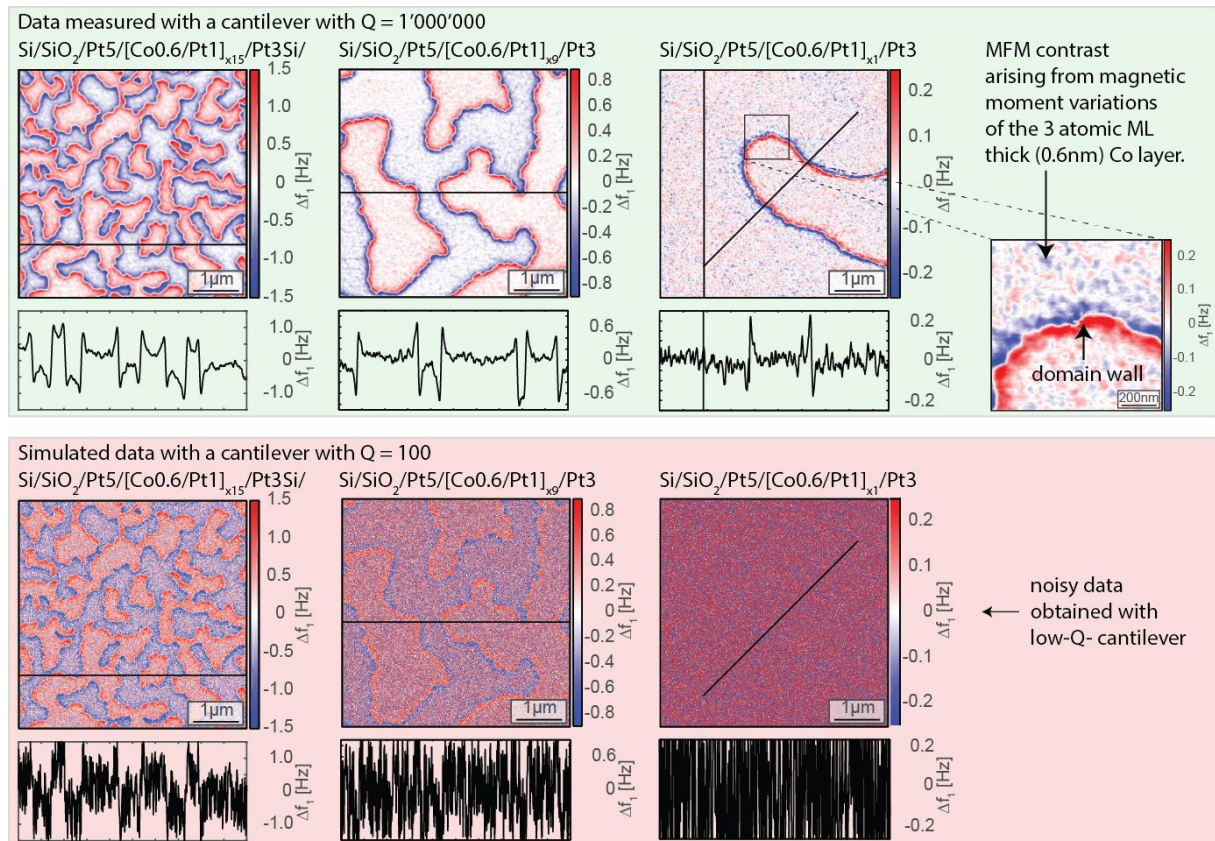


Figure 1: MFM results obtained with high-Q-cantilever (1'000'000) and a low magnetic moment MFM tip (top row) compared to simulations with $Q = 100$ (bottom row).