Application Brief

SII

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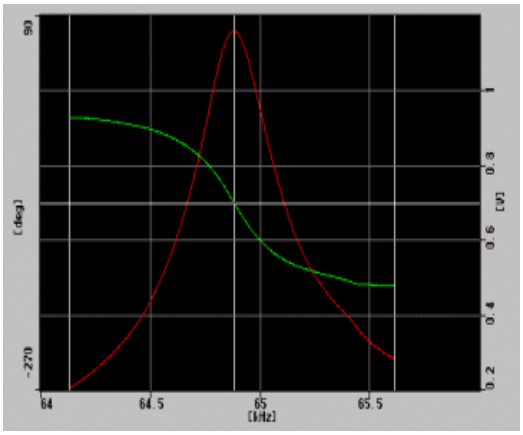
Magnetic Force Microscope (MFM) Measurement with Phase Detection Method

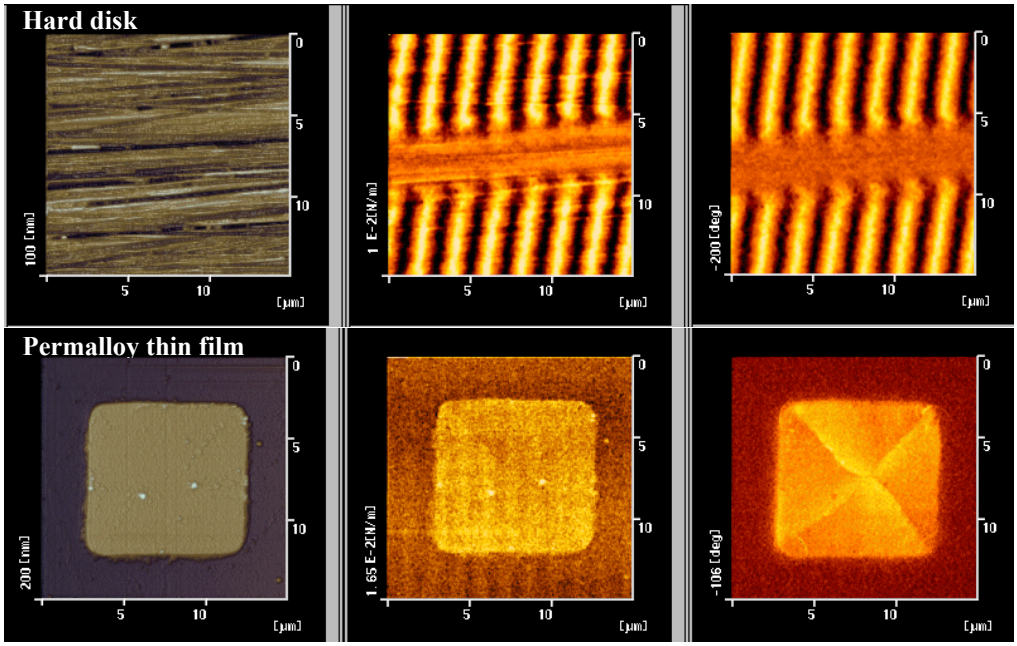
The advantage of MFM measurement with phase detection method is that weak points of amplitude detection method such as effects of surface topography on the MFM image and the effects of laser interference used in optical detection system are eliminated for the most part.

These artifacts of amplitude detection method can be appear as strongly as the actual MFM signal and to compensate, resolution had to be sacrificed by making the coat on the magnetic probe thicker in order to achieve a clear image. With phase detection method, because almost pure MFM signals can be extracted, high-resolution MFM images could be achieved by making the magnetic probe thinner, even if it meant sacrificing the magnetic sensitivity somewhat.



Amplitude curve (red) and phase curve (green)

In a hard disk measurement with the amplitude detection method, mainly effects of texture were visible on the MFM image and effects of laser interference appeared in Permalloy thin film measurements, but with the phase detection method, we have clear MFM images without these effects.



Surface shape image | MFM image (amplitude detection method) | MFM image (phase detection method)