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Design and Implementation of a Measurement System for Inspection of Magnetic Force Microscopy Probes

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The development of a measurement system for non-destructive testing of magnetic force microscopy (MFM) probes is discussed in this paper. Typical MFM probes are characterized by equipped in a conventional atomic force microscope (AFM). Test parameters are the resonance frequency of MFM probes and its response to a magnetic stray field from a standard test sample. This procedure involves tapping a MFM probe across the surface of the test sample which sometimes can cause damage and wear on the test MFM probes. The operating principle of the implemented system is similar to that used in standard AFMs/MFMs. An optical beam deflection technique is used to measure the oscillation of MFM probes corresponding to driving frequencies. The system employs a solenoid coil as a source for generating the out-of-plane magnetic field. The profile of magnetic field intensity was characterized by a gauss meter. Several commercial available MFM probes with different coating materials and ones developed in-house were used as a test sample. Measurement results were also compared with a standard AFM/MFM machine.

Keywords: MFM tip inspection, non-destructive testing, NDT, AFM, MFM, magnetic probes

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