

Development of an AFM/MFM based on Quartz Tuning Fork

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The applications of magnetic materials are being gradually miniaturized. Consequently, the research community needs to develop a set of equipments, designed specifically to study magnetic materials in sub-microscopic and nanoscopic dimensions. The objective of this project is the development of a AFM/MFM based on quartz tuning fork and software WSXM. It is divided in two steps, the first one is to develop the basic instrumentation in the form of a Atomic Force Microscope (AFM) operating in tapping mode. The tips are produced by KOH electrochemical etching from tungsten wire with initial diameter of 200 microns. The second step is to transform this unit in a Magnetic Force Microscope (MFM), through the implementation of retrace routine and covering the tip with hard magnetic materials. Currently, the tips are produced in an electrochemical unit developed to enable the etching of wire already glued on quartz tuning fork. The obtained tips show good geometry with apex diameter in the order of 100 nm. The mode AFM is already in operation. The images obtained so far allow us to observe resolutions on the order of 20 nm. The first tests with the MFM mode is running and the results will be shown.

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