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Combined RF setup for measurements of the frequency, field, and temperature dependences of the magnetic susceptibility of thin films

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Abstract

A high-sensitivity modulation technique is suggested and the corresponding instrumentation is described for the magnetic susceptibility measurements on thin-film samples in a wide temperature range and frequency intervals. The method is based on the application of an external saturating magnetic field producing a short-term removal of the effect of magnetic susceptibility on the frequency of an oscillatory circuit. Possibilities of the method and performance of the experimental setup are demonstrated by the results of measurements on a thin single-crystal silicon plate with an area of 0.4 cm², containing 10¹⁷ iron atoms, ion-implanted at an energy of 40 keV. The results indicate that sensitivity of the setup with respect to the $\Delta F/F_0$ ratio determination corresponds to the detection of 10¹⁶ iron atoms per cm². © 1997 MAEe cyrillic signK Hayka /Interperiodica Publishing.
