1. Record Nr. UNINA9910807202703321

Titolo	Magnetic resonance force microscopy and a single-spin measurement / / Gennady P. Berman ... [et al.]
Pubbl/distr/stampa	Singapore ; ; Hackensack, N.J., : World Scientific, c2006
ISBN	1-281-91928-4 9786611919283 1-61583-237-8 981-277-409-2
Edizione	[1st ed.]
Descrizione fisica	1 online resource (236 p.)
Altri autori (Persone)	BermanGennady P. <1946->
Disciplina	538.36
Soggetti	Electron paramagnetic resonance Magnetic resonance force microscopy Magnetic resonance Nuclear spin
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 217-222) and index.
Nota di contenuto	Contents; 1 Introduction; 2 Spin Dynamics - Quasiclassical Description; 3 Spin Dynamics - Quantum Description; 4 Mechanical Vibrations of the Cantilever; 5 Single-Spin Detection in Magnetic Force Microscopy (MFM); 5.1 Static displacement of the cantilever tip (CT) 5.2 Decoherence time 6 Transient Process in MFM - The Exact Solution of the Master Equation; 6.1 Hamiltonian and master equation for the spin-CT system; 6.2 Solution for spin diagonal matrix elements ; 6.3 Solution for spin off-diagonal matrix elements 7 Periodic Spin Reversals in Magnetic Resonance Force Microscopy (MRFM) Driven by 7r-Pulses 8 Oscillating Adiabatic Spin Reversals Driven by the Frequency Modulated rf Field; 8.1 Schrodinger dynamics of the CT-spin system; 8.2 Decoherence and thermal diffusion for the CT 9 Oscillating Cantilever-Driven Adiabatic Reversals (OSCAR) Technique in MRFM 9.1 CT-spin dynamics: discussion and estimates; 9.2 Experimental detection of a single spin; 10 CT-Spin Dynamics in the OSCAR Technique; 10.1 Quasiclassical theory: ple geometry

	10.2 Quantum theory of the OSCAR MRFM 10.3 OSCAR frequency shift for a realistic setup; 11 Magnetic Noise and Spin Relaxation in OSCAR MRFM; 11.1 OSCAR relaxation in a spin ensemble; 11.2 Reduction of magnetic noise; 11.3 Simple model for quantum jumps 11.4 Reduction of the frequency shift due to the CT-spin entanglement
Sommario/riassunto	Magnetic resonance force microscopy (MRFM) is a rapidly evolving field which originated in 1990's and matured recently with the first detection of a single electron spin below the surface of a non-transparent solid. Further development of MRFM techniques will have a great impact on many areas of science and technology including physics, chemistry, biology, and even medicine. Scientists, engineers, and students from various backgrounds will all be interested in this promising field. The objective of this "multi-level" book is to describe the basic principles, applications, and the advanced