



Micromachines as Tools for Nanotechnology

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Book Condition: New. Publisher/Verlag: Springer, Berlin | Addresses the use of MEMS (micro-electro-mechanical systems) and micromachined devices for the investigation of nanoscience and technology, as well as biotechnology. Such micromachined tools for nanotechnology can enhance the sensitivity, spatial resolution, dexterity, selectivity, and parallel processing capability in measuring and manipulating nano-objects. The book covers state-of-the-art MEMS and NEMS devices for DNA molecular handling and analysis, cell handling and culture on a chip, chemical lab-on-a-chip, multi-probes for vacuum tunneling microscopy and AFM, and characterization of quantum semiconductor structures. Readers will gain deep insight into such developments and students will learn about the emerging field of MEMS and nanotechnology | 1 Micromachining Tools for Nanosystems.- 1.1 Introduction.- 1.2 Bottom-Up and Top-Down Approaches.- 1.3 Combining the Two Approaches to Nanosystems.- 1.4 Micro- and Nanomachining.- 1.5 Examples of Micromachined Nanodevices.- 1.5.1 Microprobe Arrays for Ultrahigh Density Data Storage.- 1.5.2 Multiple Nanoprobes.- 1.5.3 Microfluidic Devices Incorporating Biomaterial.- 1.6 Organization of the Book.- References.- 2 Microsystems for Single-Molecule Handling and Modification.- 2.1 Stretch-and-Positioning of DNA.- 2.2 Molecular Surgery of DNA.- 2.2.1 Laser Surgery.- 2.2.2 Mechanical Surgery with an AFM Tip.- 2.2.3 Molecular Surgery with an Enzyme-Labeled Probe.- 2.2.4 Use of Local Temperature Rise.- 2.3 A Microfabricated Probe...



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