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Altri autori (Persone)	EpsteinRichard I Sheik-BahaeMansoor
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Nota di contenuto	Optical Refrigeration; Contents; Preface; 1 Optical Refrigeration in Solids: Fundamentals and Overview; 1.1 Basic Concepts; 1.2 The Four-Level Model for Optical Refrigeration; 1.3 Cooling Rare-Earth-Doped Solids; 1.4 Prospects for Laser Cooling in Semiconductors; 1.5 Experimental Work on Optical Refrigeration in Semiconductors; 1.6 Future Outlook; References; 2 Design and Fabrication of Rare-Earth-Doped Laser Cooling Materials; 2.1 History of Laser Cooling Materials; 2.2 Material Design Considerations; 2.2.1 Active Ions; 2.2.1.1 Rare-Earth Ions for Laser Cooling 2.2.1.2 Active Ion Concentration2.2.2 Host Materials; 2.2.2.1 Multiphonon Relaxation; 2.2.2.2 Chemical Durability; 2.2.2.3 Thermal and Thermomechanical Properties; 2.2.2.4 Refractive Index; 2.2.3 Material Purity; 2.2.3.1 Vibrational Impurities; 2.2.3.2 Metal-Ion Impurities; 2.3 Preparation of High-Purity Precursors; 2.3.1 Strategies for Preparing High-Purity Precursors; 2.3.2 Process Conditions; 2.3.2.1 Purity of Commercial Precursors; 2.3.2.2 Process Equipment; 2.3.2.3 Clean Environment; 2.3.3 Material Purification; 2.3.3.1 Filtration and

Sommario/riassunto

Edited by the two top experts in the field with a panel of International contributors, this is a comprehensive up-to-date review of research and applications.Starting with the basic physical principles of laser cooling of solids, the monograph goes on to discuss the current theoretical issues being resolved and the increasing demands of growth and evaluation of high purity materials suitable for optical refrigeration, while also examining the design and applications of practical cryocoolers.An advanced text for scientists, researchers, engineers, and students (masters, PHDs and Postdoc