

1. Record Nr.	UNINA9910148786303321
Titolo	Laser cooling : fundamental properties and applications // edited by Galina Nemova
Pubbl/distr/stampa	Singapore : , : Pan Stanford Publishing Pte. Ltd., , [2017] ©2017
ISBN	1-315-34105-0 1-5231-0836-3 1-315-36472-7 981-4745-05-7
Edizione	[1st ed.]
Descrizione fisica	1 online resource (478 pages) : illustrations
Disciplina	539.7
Soggetti	Laser cooling
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	1. Laser cooling of dense gases by collisional redistribution of radiation / Anne Sass, Stavros Christopoulos, and Martin Weitz -- 2. Laser cooling in rare earth-doped glasses and crystals / Galina Nemova -- 3. Progress toward laser cooling of thulium-doped fibers / Nai-Hang Kwong, Rolf Binder, Dan Nguyen, and Arturo Chavez-Pirson -- 4. Laser cooling of solids around 2.07 microns : a theoretical investigation / Guang-Zong Dong and Xin-Lu Zhang -- 5. Optically cooled lasers / Steven R. Bowman -- 6. Methods for laser cooling of solids / Stephen C. Rand -- 7. Deep laser cooling of rare earth-doped crystals by stimulated raman adiabatic passage / Andrei Ivanov, Yuriy Rozhdestvensky, and Evgeniy Perlin -- 8. Bulk cooling efficiency measurements of Yb-doped fluoride single crystals and energy transfer-assisted anti-stokes cooling in co-doped fluorides / Azzurra Volpi, Alberto Di Lieto, and Mauro Tonelli -- 9. Interferometric measurement of laser-induced temperature changes / B. Rami Reddy -- 10. Fluoride glasses and fibers / Mohammed Saad -- 11. Crystal growth of fluoride single crystals for optical refrigeration / Azzurra Volpi, Alberto Di Lieto, and Mauro Tonelli -- 12. Microscopic theory of optical refrigeration of semiconductors / Rolf Binder and Nai-Hang

Sommario/riassunto

In the recent decades, laser cooling or optical refrigeration--a physical process by which a system loses its thermal energy as a result of interaction with laser light--has garnered a great deal of scientific interest due to the importance of its applications. Optical solid-state coolers are one such application. They are free from liquids as well as moving parts that generate vibrations and introduce noise to sensors and other devices. They are based on reliable laser diode pump systems. Laser cooling can also be used to mitigate heat generation in high-power lasers. This book compiles and details cutting-edge research in laser cooling done by various scientific teams all over the world that are currently revolutionizing optical refrigerating technology. It includes recent results on laser cooling by redistribution of radiation in dense gas mixtures, three conceptually different approaches to laser cooling of solids such as cooling with anti-Stokes fluorescence, Brillouin cooling, and Raman cooling. It also discusses crystal growth and glass production for laser cooling applications. This book will appeal to anyone involved in laser physics, solid-state physics, low-temperature physics or cryogenics, materials research, development of temperature sensors, or infrared detectors.

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2. Record Nr.	UNINA9910142205903321
Titolo	The quarterly journal of mechanics and applied mathematics
Pubbl/distr/stampa	Oxford, UK, : Oxford University Press
ISSN	1464-3855
Descrizione fisica	1 online resource
Disciplina	510
Soggetti	Mathematics Mechanics Mechanik Zeitschrift Online-Ressource Angewandte Mathematik Popular Science and Nature Periodicals.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Periodico
Note generali	Refereed/Peer-reviewed
Sommario/riassunto	Contains full text of articles, 1998- ; abstracts only, 1996-1997.