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Cavity Optomechanics Nano And Micromechanical

Cavity optomechanics and cooling nanomechanical ...

In recent years, the combination of optical microcavities and micromechanical systems has triggered a rapid development of the research field cavity optomechanics [1-3J Most generally speaking, this field of research investigates the interaction of

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Cavity optomechanics - FAU

The field of cavity optomechanics is reviewed This field explores the interaction between electromagnetic radiation and nanomechanical or micromechanical motion This review covers the basics of optical cavities and mechanical resonators, their mutual optomechanical interaction

Femtogram dispersive L3-nanobeam optomechanical cavities ...

micromechanical oscillator," Nat Phys 4 (5), 415–419 (2008) 13 I Wilson-Rae, P Zoller, and A Imamoğlu, "Laser cooling of a nanomechanical resonator mode to its quantum two-dimensional photonic crystal nanocavity," Nano Lett 12 (5), 2299–2305 (2012), doi:101021/nl300142t 35 D Bindel and S Govindjee, "Elastic PMLs

Cavity Optomechanics: a playground for fundamental tests ...

2 Micro- and nano-(opto)-electro-mechanical devices, ie, MEMS, MOEMS and NEMS are extensively used in many technological applications : • high-sensitive sensors (accelerometers, atomic force microscopes, mass sensors…) • actuators (in printers, electronic devices…) • These devices operate in the classical regime for both the electromagnetic field and the motional degree of freedom

in cavity optomechanics - arXiv

in cavity optomechanics Y Zhao, D J Wilson, K-K Ni, and H J Kimble Norman Bridge Laboratory of Physics, 12-33, California Institute of Technology, Pasadena, California 91125 hjkimble@caltechedu Abstract: Extraneous thermal motion can limit displacement sensitivity and radiation pressure effects, such as optical cooling, in a cavity-

ICAP CR 8

Mechanical oscillators coupled to the electromagnetic mode of a cavity have emerged as an important new frontier in quantum optics By utilizing low-optical-loss and high-Q nano-and micromechanical elements, researchers can now achieve significant coupling to the cavity …

Quantum optomechanics - CaltechAUTHORS

Early optomechanics Put simply, a cavity optomechanical system is an optical or microwave cavity that contains a mechan-ical element, a moving part that can support collec- used the method to cool nano- and micromechanical levers, in both the optical and microwave domains Today, high-quality optomechanical devices pro-

Electromagnetically induced transparency and tunable fano ...

Experimental progress in last decade has made cavity opto-mechanics a playground for the study of a variety of regimes, from quantum ground-state cooling [1] to strong coupling dynamics [2] Combining optomechanics with mechanical elements like nano/micromechanical membranes [3] on one hand, and atoms [4] and Bose–Einstein condensates on the

Design of dispersive optomechanical coupling and cooling ...

Design of dispersive optomechanical coupling and cooling in ultrahigh-Q/V slot-type photonic crystal cavities Ying Li,* Jiangjun Zheng, Jie Gao, Jing Shu, Mehmet Sirin Aras, and Chee Wei Wong

Markus Aspelmeyer - arXiv

netic radiation and nano- or micromechanical motion This review covers the basics of optical rapidly growing interest into cavity optomechanics On the one side, there is the highly sensitive optical detec-tionofsmallforces,displacements,masses,andaccelera-tions Ontheotherhand,cavityquantumoptomechan-

OPTOMECHANICS Cooling of a levitated nanoparticle to the ...

These cavity-cooling schemes have been used in the past to achieve ground-state cooling of various systems ranging from individual atoms to cryogenically cooled modes of solid-state nano- and micromechanical oscillators in the context of cavity optomechanics (14) Previous attempts to apply cavity cooling to levitated solids have proven

Monolithic integration of a nanomechanical resonator to an ...

Monolithic integration of a nanomechanical resonator to an optical microdisk cavity Onur Basarir,1,2 Suraj Bramhavar,1 and Kamil L Ekinci1,∗ 1College of Engineering and the Photonics Center, Boston University, Boston, Massachusetts, 02215, USA 2Present address : Fakultat f¨ur Physik and Center for NanoScience, Ludwig-Maximilians-Universit¨at, Geschwister-Scholl-Platz 1, 80539 M unchen

Optomechanical and photothermal interactions in suspended ...

Optomechanical and photothermal interactions in suspended photonic crystal membranes David Woolf,1 Pui-Chuen Hui,1 Eiji Iwase,1,3 Mughees Khan,1,4 Alejandro W Rodriguez,1,2 Parag Deotare,1,5 Irfan Bulu,1 Steven G Johnson,2 Federico Capasso,1 and Marko Loncar1∗ 1School of Engineering and Applied Sciences, Harvard University, Cambridge, MA 02138 USA 2Department of Mathematics, …

Optical and mechanical design of a “zipper” photonic ...

Optical and mechanical design of a “zipper” photonic crystal optomechanical cavity Jasper Chan, Matt Eichenfield, Ryan Camacho, and Oskar Painter

Suppression of extraneous thermal noise in cavity ...

both the cavity decay rate and the mechanical re-thermalization rate [13–17] These represent two basic requirements for ground-state cooling using cavity back-action [18–20], a milestone which has recently been realized in several systems [8,15,16], signaling the emergence of a new field of cavity “quantum” opto-mechanics [5]

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in Cavity Optomechanics: Nano- and Micromechanical Resonators Interacting with Light, July 7, 2014 (Springer link) 3 Alex G Krause, Tim D Blasius, and Oskar Painter, ”Optical read out and feedback cooling of a nanostring optomechanical cavity,” arXiv:150601249, June 3, 2015 4

Design of tunable GHz-frequency optomechanical crystal ...

Design of tunable GHz-frequency optomechanical crystal resonators Hannes Pfeifer1, Taofiq Paraïso1, Leyun Zang1 and Oskar Painter2* 1Max Planck Institute for the Science of Light, Günther-Scharowksy-Straße 1, 91058 Erlangen, Germany 2Institute for Quantum Information and Matter and Thomas J Watson, Sr, Laboratory of Applied Physics, California