

1. Record Nr.	UNISA996418176103316
Autore	Cripe Jonathan
Titolo	Broadband Measurement and Reduction of Quantum Radiation Pressure Noise in the Audio Band [[electronic resource] /] / by Jonathan Cripe
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-45031-7
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XIX, 140 p. 120 illus., 78 illus. in color.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	535.15
Soggetti	Gravitation Quantum optics Astrophysics Classical and Quantum Gravitation, Relativity Theory Quantum Optics Astrophysics and Astroparticles
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Gravitational Waves and Gravitational Wave Detectors -- Optical Springs -- Cantilever Micro-Mirror and Optomechanical Cavity Design -- Radiation-Pressure-Mediated Control of an Optomechanical Cavity -- Observation of an Optical Spring from a Beamsplitter -- Broadband Measurement of Quantum Radiation Pressure Noise at Room Temperature -- Quantum Radiation Pressure Noise Reduction and Evasion -- Future Work and Conclusion.
Sommario/riassunto	This book presents a direct measurement of quantum back action, or radiation pressure noise, on a macroscopic object at room temperature across a broad bandwidth in the audio range. This noise source was predicted to be a limitation for gravitational wave interferometers in the 1980s, but it has evaded direct characterization in the gravitational wave community due to the inherent difficulty of reducing thermal fluctuations below the quantum back action level. This back action noise is a potential limitation in Advanced LIGO and Advanced Virgo, and Cripe's experiment has provided a platform for the demonstration

of quantum measurement techniques that will allow quantum radiation pressure noise to be reduced in these detectors. The experimental techniques Cripe developed for this purpose are also applicable to any continuous measurement operating near the quantum limit, and could lead to the possibility of observing non-classical behavior of macroscopic objects. .

---