



Optical Coatings and Thermal Noise in Precision Measurement

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Thermal noise from optical coatings is a growing area of concern and overcoming limits to the sensitivity of high precision measurements by thermal noise is one of the greatest challenges faced by experimental physicists. In this timely book, internationally renowned scientists and engineers examine our current theoretical and experimental understanding. Beginning with the theory of thermal noise in mirrors and substrates, subsequent chapters discuss the technology of depositing coatings and state-of-the-art dielectric coating techniques used in precision measurement. Applications and remedies for noise reduction are also covered. Individual chapters are dedicated to specific fields where coating thermal noise is a particular concern, including the areas of quantum optics/optomechanics, gravitational wave detection, precision timing, high-precision laser stabilisation via optical cavities and cavity quantum electrodynamics. While providing full mathematical detail, the text avoids field-specific jargon, making it a valuable resource for readers with varied backgrounds in modern optics.

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Editorial Review

About the Author

Gregory Harry has worked in the field of gravitational wave detection for over 15 years and is currently the Optics Chair and Coating Cognizant Scientist for the Laser Interferometer Gravitational Wave Observatory (LIGO) and Professor at the American University, Washington, DC. He is amongst the pioneers of coating thermal noise research.

Timothy Bodiya is a graduate student in the Physics Department at Massachusetts Institute of Technology. He is conducting research in the field of gravitational wave physics and quantum optomechanics with the goal of measuring quantum effects on every day sized objects (gram to kg size).

Riccardo DeSalvo is Professor at the University of Sannio in Benevento, Italy. Previously he has held the positions of Senior Staff Scientist at LIGO, Caltech, Pasadena and that of Staff Scientist at INFN in Pisa, Italy. He is a member of ASME, APS and SIF and has authored more than two hundred refereed papers.

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