

Preface

This book presents the field of cavity optomechanics from the perspective of leading groups around the world. Our hope is that it will serve as a useful overview of the various approaches to this rapidly developing field at the intersection of nanophysics and quantum optics. We would like to think that especially young researchers starting in cavity optomechanics will benefit from this comprehensive presentation, as well as those more expert readers who enter the field from another area.

The idea of compiling such a volume was hatched while planning the workshop “Mechanical Systems in the Quantum Regime,” which the three of us organized in 2009 and which took place as a Wilhelm-and-Else-Heraeus Seminar at the physics center of the German Physical Society in Bad Honnef, Germany, from 19 to 22 July 2009. It was one of the very first workshops that was devoted to a great extent to the then nascent field of cavity optomechanics. Even at that time, it became apparent that the number of groups working on this topic was growing quickly, and the developments have accelerated ever since then.

Admittedly, when we first sent around guidelines for writing the chapters in the late summer of 2010, we did not anticipate that it would take 3 years to finish this endeavor. In retrospect, however, it is an indicator of scientific vigor: we could have foreseen that a fast emerging field has a stronger focus on “doing the science” rather than “reviewing the science.” We would like to thank all authors for their time and effort in providing such excellent overviews while they have been constantly pushing the field forward. Special thanks go to Claus Ascheron for initiating the project and to Dan Stamper-Kurn for persistently pushing us to finalize it.

We are delighted that you are now holding in your hands a view on the subject of cavity optomechanics through the eyes of some of the leading experts in the field. We are confident that their contributions, emphasizing the foundations of the field, will remain a valuable resource for beginners and experts alike, and will provide the basis for the next exciting developments in the field.

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Cavity Optomechanics

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