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## Preface

Science does not evolve continuously, nor does it generate new knowledge instantly, or even reflect the effort spent on its inception – progress occurs in jumps. Being immersed in daily research work, it is sometimes hard to assess the impact of the numerous scientific accomplishments that have been reported. However, from today's vantage point *Bose–Einstein condensation with cold atomic gases* in the year 1995 was such a “quantum leap” for quantum physics.

By gaining complete control over the center of mass motion of a single atomic particle, by mastering its internal interaction with electro-magnetic fields, and most recently, by steering the real-time dynamics between pairs of atomic particles, the community of atomic, molecular and optical physics has created a novel physical system where genuine many-particle phenomena can be “tailored to order”. These prospects have also created tremendous interest in other fields of physics, such as condensed matter physics, statistical physics, solid state physics, nuclear matter physics, or plasma physics, where collective excitations and many-particle correlations have always been the focus of attention.

In response to the emergence of such a new interdisciplinary field in the physics of ultra cold degenerate gases the journal *Optics Communications* has dedicated the present special issue to this research area. The special issue aids the timely communication of novel research findings and provides review articles from international experts who give reference to well established facts within each community.

In thumbing through the issue, I think each reader will notice the high publication standards of the journal. This was only possible due to the highly original submissions of the authors and the ruthless scrutiny of the referees for which we are very grateful. Moreover, I thank Dennis Couwenberg from Elsevier Publishing and the editorial office in Ulm for making this special issue possible.

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