



AUSTRALIAN RESEARCH COUNCIL  
CENTRE OF EXCELLENCE FOR  
QUANTUM-ATOM OPTICS



THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA

## **MEDIA RELEASE LAUNCH OF THE BOOK "QUANTUM SQUEEZING"**

The new book "Quantum Squeezing" (Eds. Peter Drummond and Z. Ficek, Springer, 2004) will be launched at the University of Queensland Node of the ARC Centre of Excellence for Quantum-Atom Optics, on Monday 22 November 2004, at 4:00pm, in the Conference Room 237 (Bld. 6, Physics Annexe, Department of Physics, University of Queensland, St Lucia Campus).

The book covers the new topic of squeezing in quantum fields, encompassing all types of systems in which quantum fluctuations are reduced below those in the normal vacuum state. In the first comprehensive overview of this area, it presents the currently known techniques of generating squeezed photon fields, together with treatments of matter field squeezing. Both theory and experiments are treated, together with applications to communications and measurement.



The book "Quantum Squeezing" explains the latest developments in this field, emphasizing the enormous progress over the last two decades in controlling quantum fluctuations, which are the origin of all quantum mysteries and paradoxes.

All physical measurements are subject to fluctuations. Even if the known sources of noise are eliminated, as in a perfect vacuum, there are fluctuations according to quantum theory. These are called quantum fluctuations, and impose a fundamental limit on any measurements in science.

In the last two decades theoretical studies followed closely by experimental measurements have shown how quantum fluctuations can be reduced and even completely suppressed. This has become a new subject, now called quantum squeezing.

The secret of these developments is good old horse-trading. Quantum mechanics allows precise measurement of one quantity, provided the fluctuations increase in another. The first experimental realization of this prediction, using lasers, was in 1985 -- by Richard Slusher at AT&T Bell Laboratories.

Since then, the various techniques and applications of the field of quantum squeezing have metamorphosed into a central tool in the wider areas of quantum spectroscopy and quantum information. Currently, this is a rapidly changing research field, and the areas of applications, in particular, are the most rapidly changing of them all.

The book "Quantum Squeezing" is a unique contribution by the foremost international experts responsible for some of the chief developments. It covers the field from the early ideas to the most recent developments, from generating squeezing to applying it.

### **Media:**

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