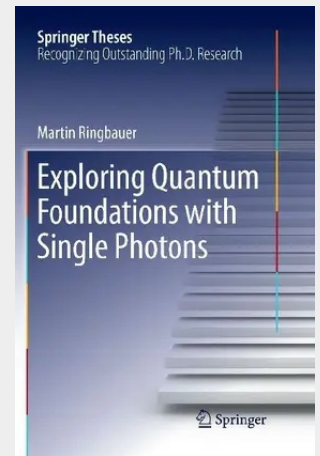


Exploring Quantum Foundations with Single Photons

This thesis uses high-precision single-photon experiments to shed new light on the role of reality, causality, and uncertainty in quantum mechanics. It provides a comprehensive introduction to the current understanding of quantum foundations and details three influential experiments that significantly advance our understanding of three core aspects of this problem. The first experiment demonstrates that the quantum wavefunction is part of objective reality, if there is any such reality in our world. The second experiment shows that quantum correlations cannot be explained in terms of cause and effect, even when considering superluminal influences between measurement outcomes. The final experiment in this thesis demonstrates a novel uncertainty relation for joint quantum measurements, where the textbook relation does not apply.

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**106,99 €**

99,99 € (zzgl. MwSt.)

*Lieferfrist: bis zu 10 Tage***Artikelnummer:** 9783319879192**Medium:** Buch**ISBN:** 978-3-319-87919-2**Verlag:** Springer**Erscheinungstermin:** 11.08.2018**Sprache(n):** Englisch**Auflage:** Softcover Nachdruck of the original 1. Auflage 2017**Serie:** Springer Theses**Produktform:** Kartoniert**Gewicht:** 353 g**Seiten:** 208**Format (B x H):** 155 x 235 mm