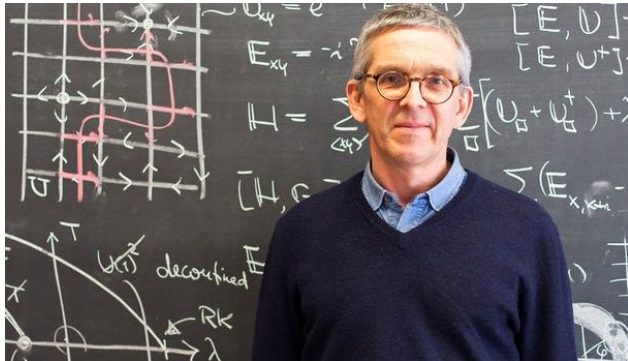


Freitag, 12. Mai 2023, 13 Uhr c.t. im Hörsaal I des Physikalischen Instituts



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Universität Bern

„A New Momentum Concept for a Particle in a Box“

A particle confined to a space with impenetrable boundaries is familiar from introductory lectures in quantum mechanics. Corresponding physical systems are, for example, cold atoms in an optical box trap, electrons in a quantum dot, or particles confined to a finite interval in extra-dimensional space. The momentum of a confined particle is a subtle physical quantity. A standard momentum measurement yields a plane wave state with continuous momentum value that even exists outside of the box. A new momentum concept, on the other hand, provides quantized values and leaves the particle inside the box after a momentum measurement. This leads to a generalization of the uncertainty relation, new insights into the Ehrenfest theorem, as well as a new perspective on the physical nature of momentum at the quantum level. The new momentum concept will be visualized with bouncing wave packets that undergo fractional wave function revival.

