
Kolloquium des Instituts für Angewandte Physik / Quantentechnologien



Zeit: **Dienstag 28.10.2025, 16 Uhr**

Ort: Gebäude S2 | 15, Raum 134 (Handbibliothek)

From quantum foundations to quantum technologies

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A central question in the field of quantum foundations is what makes quantum mechanics special compared to other probabilistic theories, whether those arising from more classical ideas of nature, such as realism, or from more general principles. While Bell's theorem (1964) rules out the possibility of quantum phenomena having local realistic explanations, much less is known about how quantum mechanics compares to principles that could lead to a more general theory of nature. In the first part of my talk, I will present ongoing work aimed at deriving predictions within a theory based solely on informational axioms, and discuss the situations in which these predictions coincide with those of quantum mechanics.

Insights gained from studying the foundations of quantum mechanics can also benefit the development of quantum technologies. While quantum cryptography is a well-known example, connections to quantum computing remain much less explored. In the second part of my talk, I will show how lessons learned from quantum foundations can help design tests of quantum devices, enabling the assessment and improvement of control over quantum systems.