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The Role of Applications in the History of Quantum Mechanics

Monday 31 March 2025 12:15 (45 minutes)

In my talk, I will challenge the conventional division between foundations and applications in physics and explore how physicists throughout the history of quantum mechanics have applied the theory and extended its scope beyond its original domains. Rather than merely solving specific problems, many applications of quantum mechanics to new domains (scattering, complex atoms, molecules, solids, nuclei) were drivers of conceptual innovation and played pivotal roles in shaping both the theory and its interpretation. I will illustrate this with a few examples from the early history of quantum mechanics. Without these applications, which are often dismissed as merely derivative extensions, the textbooks of quantum mechanics would look very different. There is untapped potential for physicists, historians, and philosophers to delve deeper into the applications of quantum mechanics. This perspective not only enriches historical studies and broadens the focus to include developments in fields that conventional wisdom considers less fundamental, but also provides tools for understanding contemporary developments in fields like quantum information and quantum computing, where practical applications carry considerable weight.

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