Physics Colloquium Mainz

February 06, 2024 at 16 c.t.

Lecture room KPH,
Johann-Joachim-Becher-Weg 45, JGU

Everything around us, everything each of us has ever experienced, and virtually everything underpinning our technological society and economy is governed by quantum mechanics. Yet this most fundamental physical theory of nature often feels as if it is a set of somewhat eerie and counterintuitive ideas of no direct relevance to our lives. Why is this? One reason is that we cannot perceive the strangeness (and astonishing beauty) of the quantum mechanical phenomena all around us by using our own senses.

I will describe the history of development of techniques that allow us to visualize electronic quantum phenomena and new states of quantum matter directly at the atomic scale. As recent examples, we will visually explore the previously unseen and very beautiful forms of quantum matter making up electronic liquid crystals [1,2], high temperature superconductors [2,3,4] and electron-pair crystals [5,6,7,8]. I will discuss the implications for fundamental physics research and also for advanced materials and new technologies, arising from quantum matter visualization.

Visualizing Quantum Matter

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