New Faculty Spotlight: Thomas Scaffidi, Department of Physics & Astronomy

Professor Scaffidi studies the quantum behavior that emerges in materials at different scales.

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Professor Scaffidi just published research in the journal *Nature* detailing a newly-discovered way that electrons can behave.

Picture Credit:
Thomas Scaffidi

When a system has a large number of interacting components, it can exhibit emergent properties that the individual components do not have on their own. Professor Thomas Scaffidi, who joined the UCI Department of Physics & Astronomy this July, studies this concept as it appears in quantum science, wherein materials he described as “quantum matter” have emergent properties for which quantum mechanics plays a key part. “The main questions I try to address are: Can we find new phases of quantum matter, and, if so, what are they good for? Quantum computing, materials research, device development?” Said Scaffidi, who received his Ph.D. in physics from the University of Oxford. “In my work, the objects I study are typically electrons in a solid – but they could also be atoms trapped by a laser, or qubits in a quantum computer. The beautiful thing about emergence is that it does not really matter.” One recent project in this vein, which just published in the journal *Nature*, describes the emergent properties of electrons flowing through a wire like a viscous fluid. The hardest but also the most rewarding part of doing such science is, for Scaffidi, being a good mentor for his graduate students. “There are so many different ways to do good science, and each student is so unique that it is never obvious what is the best way to help a student: breadth vs. depth, hands-on vs hands-off, and so on,” Scaffidi said. “This makes it all the more rewarding when a student is thriving and enjoying their Ph.D program.”

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