



复旦大学物理系 物质科学报告

Time: 2:00p.m. Tuesday, 2017.12.19

Location: Physics Building 221(B)

Building with Crystals of Light and Quantum Matter: From clocks to computers

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Understanding the behavior of interacting electrons in solids or liquids is at the heart of modern quantum science and necessary for technological advances. However, the complexity of their interactions generally prevents us from coming up with an exact mathematical description of their behavior. Precisely engineered ultracold gases are emerging as a powerful tool for unraveling these challenging physical problems. In this talk, I will present recent developments at JILA on using alkaline-earth atoms (AEAs) --currently the basis of the most precise atomic clock in the world-- for the investigation of complex many-body phenomena and magnetism. I will discuss recent progress in one dimensional optical lattice clocks to engineer and probe a many-body system where interactions become comparable with synthetically induced spin-orbit-coupling. I will report our capability to characterize the magnetization dynamics in terms of an XXZ Heisenberg model, an iconic model used in condensed matter to describe a broad class of systems ranging from superconductors to quantum magnets.



Prof. Ana Maria Rey is an AMO theorist working on the interface between atomic, molecular, and optical physics, condensed matter physics, and quantum information science. She has made significant contributions in quantum simulations, and quantum state engineering, and her present research interests focus on developing new techniques for controlling quantum systems, and then using them in various applications ranging from quantum simulations/information to time and frequency standards.

Prof. Ana Maria Rey got her PHD degree at University of Maryland—College Park, and did postdoc at Harvard ITAMP. She joined Colorado University, Boulder as a faculty in 2008. For her contributions to AMO quantum systems, she has been won several prestigious awards, such as APS Fellowship in 2015, the Presidential Career Award for Scientists and Engineers in 2013, MacArthur Genius Grant in 2013, and the 2014 Maria Geoppert Mayer Award of APS.