

Colloquium

Quantum simulation with ultracold atoms in optical lattices

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Predicting the dynamics of an interacting many-body system is often a challenging task either by an analytical method or by numerical simulation. The way to a faster and more accurate solution was embedded in the vision of Feynman's quantum computers for universal quantum simulations. Ultracold quantum gases offer unique possibilities to simulate quantum dynamics in a highly controllable and precisely tuneable setup. In this talk, I will present an introduction of the field providing a state-of-the-art picture. Specifically, I will present the results obtained with a rubidium Bose-Einstein condensate loaded in an optical lattice. Using a scanning electron microscope [1], we prepared the initial state and observed "Negative differential conductivity" in an interacting quantum gas [2].

References:

[1] B. Santra and H. Ott, J. Phys. B. 48, 122001 (2015)

[2] R. Labouvie, B. Santra, S. Heun, S. Wimberger, H. Ott, Phys. Rev. Lett. 115, 050601 (2015)

Tuesday, Apr 3rd 2018

11:30 AM (Tea/Coffee at 11:00 AM)

Auditorium, TIFR-H