Colloquium
Physics Department
Temple University

Density oscillations induced by individual ultracold two-body collisions

Prof. Doerte Blume

Department of Physics and Astronomy
University of Oklahoma

Access to single particle momenta provides new means of studying the dynamics of few interacting particles. In a joint theoretical and experimental effort, we observe and analyze the effects of a finite number of ultracold two-body collisions on the relative and single-particle densities by quenching two ultracold atoms with initial narrow wave packet into a wide trap with inverted aspect ratio. The experimentally observed spatial oscillations of the relative density are reproduced by a parameter-free zero-range theory and interpreted in terms of cross-dimensional flux. We theoretically study the long time dynamics and find that the system does not approach its thermodynamic limit. The set-up can be viewed as an advanced particle-collider that allows one to watch the collision process itself.

April 1, 2019, 3pm in SERC 116