中央大學物理學系

Department of Physics, National Central University

Colloquium

Ultracold atoms and subwavelength optical lattices

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Abstract

Traditionally, optical lattices are created by interfering two or more laser beams, so that atoms are trapped at minima or maxima of the emerging interference pattern depending on the sign of the atomic polarizability. The characteristic distances over which such lattice potentials change are limited by diffraction and thus cannot be smaller than half of the optical wavelength. The diffraction limitation can be overcome and subwavelength lattices can be created using coherent coupling between atomic internal states. In the present talk we will first present an overview on ultracold atoms and optical lattices. Subsequently we will discuss various ways to produce subwavelength lattices and effects manifesting in these systems. In particular, we will present our recent work on periodically driven subwavelength lattices, as well on two-dimensional subwavelength lattices affected by the synthetic magnetic flux. Ongoing research on many-body effects for subwavelength lattices will also be discussed.