

Nanoplasmonic Lattices for Ultracold Atoms

Mon, 2013-02-11 15:26 - [Mattia Giardini](#) [1] **Date:** 2012-12-06

Author(s):

M. Gullans, T. Tiecke, D.E. Chang, J. Feist, J.D. Thompson, J.I. Cirac, P. Zoller, M.D. Lukin

Reference:

Phys. Rev. Lett. 109, 235309 (2012)

doi:10.1103/PhysRevLett.109.235309

We propose to use subwavelength confinement of light associated with the near field of plasmonic systems to create nanoscale optical lattices for ultracold atoms. Our approach combines the unique coherence properties of isolated atoms with the subwavelength manipulation and strong light-matter interaction associated with nanoplasmonic systems. It allows one to considerably increase the energy scales in the realization of Hubbard models and to engineer effective long-range interactions in coherent and dissipative many-body dynamics. Realistic imperfections and potential applications are discussed.

- [12.10.+i Simulations of many-body interactions](#) [2]
- [41.95.+m Quantum magnetometry](#) [3]
- [AQUTE](#) [4]
- [Result](#) [5]
- [15.10.Ne Neutral atoms: electronic states](#) [6]
- [17.80.+h Hybrid systems](#) [7]
- [15.20.Mc Magnetic atom chips](#) [8]

Source URL: <http://qurope.eu/db/publications/nanoplasmonic-lattices-ultracold-atoms>

Links:

[1] <http://qurope.eu/users/giardini>

[2] <http://qurope.eu/category/qics/10-quantum-computation/12-simulations/1210i-simulations-many-body-interactions>

[3] <http://qurope.eu/category/qics/40-quantum-information-technologies/41-metrology/4195m-quantum-magnetometry>

[4] <http://qurope.eu/category/projects/ips/aqute>

[5] <http://qurope.eu/category/attribute/result>

[6] <http://qurope.eu/category/qics/10-quantum-computation/15-implementations-quantum-optics/1510ne-neutral-atoms-electron>

[7] <http://qurope.eu/category/qics/10-quantum-computation/17-other-implementations/1780h-hybrid-systems>

[8] <http://qurope.eu/category/qics/10-quantum-computation/15-implementations-quantum-optics/1520mc-magnetic-atom-chips>