Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Anderson localization of pairs in bichromatic optical lattices GIULIANO ORSO, GABRIEL DUFOUR, Laboratoire Materiaux et Phenomenes Quantiques, University Paris Diderot and CNRS, France — We investigate the formation of bound states made of two interacting atoms moving in a one dimensional quasi-periodic optical lattice. We derive the quantum phase diagram for Anderson localization of both attractively and repulsively bound pairs. We calculate the pair binding energy and show analytically that its behavior as a function of the interaction strength depends crucially on the nature -extended, multifractal, localized- of the single-particle atomic states. Experimental implications of our results are discussed. Reference: Phys. Rev. Lett. 109, 155306 (2012)

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Date submitted: 26 Nov 2012 Electronic form version 1.4