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Effects of interaction on the localization of ultracold atoms in 1D quasi-periodic potentials FRANCO DALFOVO, MARCO LARCHER, University of Trento, Italy, MICHELE MODUGNO, University of Florence, Italy — We study the time evolution of an atomic wave-packet in a one-dimensional sinusoidal quasi-periodic potential by numerically solving a discrete Gross-Pitaevskii equation. The results are compared with those obtained for the Anderson localization of noninteracting particles. For the shape of the initial wave-packet we use both a wavefunction completely localized in a single lattice site and a broader wavefunction having Gaussian envelope. In both cases, there are evidences of a destruction of the localization by the interaction between atoms. In particular, a repulsive interaction causes a broadening of the crossover between extended and exponentially localized states and an upward shift of the strength of the disorder needed to localize the atoms. We discuss also the connections between our results and current experiments with ultracold atoms in bichromatic lattices.

Franco Dalfovo
University of Trento, Italy

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