

Correlated metallic few-particle bound states in quasiperiodic potentials

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Abstract:

Single particle states in a chain with a quasiperiodic potential show a metal-insulator transition upon the change of the potential strength. We consider two particles with local interaction in the single particle insulating regime. The two particle states change from being localized to delocalized upon an increase of the interaction strength to a non-perturbative finite value [1]. At even larger interaction strength the states become localized again. This transition of two particle bound states into a correlated metal is due to a resonant mixing of the noninteracting two particle eigenstates. In the discovered correlated metal states two particles move coherently together through the whole chain, therefore contributing to a finite conductivity.

References:

1. Sergej Flach, Mikhail Ivanchenko and Ramaz Khomeriki, EPL 98 (2012) 66002.