The Abdus Salam International Centre for Theoretical Physics

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POSTER No.1

Doublon Relaxation in the Bose-Hubbard Model

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Abstract:

The decay of a high-energy double occupancy state, doublon, in a narrow-band lattice requires the creation of a coherent many-particle excitation. This leads to an exponentially long relaxation time of such a state. We show that, if the average occupation number is sufficiently small, the corresponding exponent may be evaluated exactly. To this end we develop the quasiclassical approach to calculation of the high- order tree-level decay amplitudes.

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United Nations Educational, Scientific and Cultural Organization

IAEA International Atomic Energy Agency

POSTER No.2

Thermal and Electrical Quantum Hall Effects in Ferromagnet/Topological Insulator/Ferromagnet Junction

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Abstract:

We present a theoretical description for a class of experimental setups that measure quantum Hall coefficients in ferromagnet/topological insulator/ferromagnet (FM-TI-FM) junctions. We predict that, varying the magnetization direction in ferromagnets, one can change the induced Hall voltage and transverse temperature gradient from the maximal values, corresponding to the quantized Hall coefficients, down to their complete suppression to zero. We provide detailed analysis of thermal and electrical Hall resistances as functions of the magnetization directions in ferromagnets, the spin scattering time in TI, and geometrical positions of FM leads and measurement contacts. We find a special symmetric configuration of the experimental setup, at which the quantum Hall coefficients are independent of spin scattering.