



Location University of Regensburg, Dept. of Physics
Room PHY 5.0.21

Time Thursday, 3rd Dezember 2009
3:15 p.m.

Speaker **Dr. Hamed Saberi**
Dept. of Physics, University of Munich

Title Matrix-product formalism for strongly correlated systems and quantum information processing

Abstract In this talk I will demonstrate how the matrix-product formalism provides a flexible structure for simulation of strongly correlated system as well as generation of multipartite entanglement. We provide protocols for an efficient sequential generation of entangled multi-qubit states under realistic experimental constraints. We consider a realistic scenario in which an ancillary system with a limited number of levels performs restricted sequential interactions with qubits in a row. The proposed method relies on a suitable local optimization procedure, yielding an efficient recipe for the realistic and approximate sequential generation of any entangled multiqubit state. Similar optimization techniques can be used for approximate generation of global "entanglers" (unitary operations acting simultaneously on a multiqubit chain) within a sequential prescription.

References:

H. Saberi, A. Weichselbaum, L. Lamata, D. Perez-Garcia, J. von Delft, and E. Solano, Phys. Rev. A 80, 022334 (2009)

H. Saberi, A. Weichselbaum, and J. von Delft, Phys. Rev. B **78**, 035124 (2008)

Contact: Prof. Milena Grifoni, Phone 2035