One of the most serious problems raised by attempts to build devices based on qubits is the decoherence induced by the residual couplings between these small systems and their environment. Instead of trying to eliminate this quantum noise, an alternative strategy has been proposed some years ago by Kitaev, namely to build quantum circuits which would be to a large extent insensitive to external perturbations. This is achieved by a deeply non-local coding of the information in terms of many-body wave functions.

I will present two types of superconducting arrays which exhibit degenerate ground-states relatively immune to local noisy perturbations. The first type provides a way to implement physically a gauge theory model with a discrete local symmetry group. The second one simulates a quantum Ising-like model with a set of anticommuting non-local symmetries attached to rows and columns of the lattice and is closely related to an Abelian Chern-Simons lattice gauge theory.

Donnerstag, den 06. Juli 2006

*Einführung: Dr. M. Greiter

Die Vorträge finden um 17 Uhr c.t. im Kleinen Hörsaal B statt.
Die Dozenten der Theoretischen Physik
http://www.physik.uni-karlsruhe.de/veranst.html
Tel: 608-3367