SICENTIFIC REPORT FOR A SHORT VISIT GRANT
VISITOR: DMITRY IOFFE HOST: BALINT TOTH

Purpose of the visit. The main purpose of the visit was to promote a joint research agenda and to continue a join collaboration in the area of stochastic geometric representation of quantum spin systems on finite graphs.

Description of the work carried out during the visit. Stochastic representations for both ground states and low temperature states were set up and partially investigated for the anisotropic Heisenberg model, a model of interacting bosons and the transverse field Ising model on various graphs.

Description of the main results obtained. Infinite dimensional recursions were set up and discussed for anisotropic Heisenberg model and the transverse field Ising model on trees. Phase diagram of the ground state anisotropic Heisenberg model on a bipartite graph was derived, and the corresponding low temperature phase diagram was discussed. A large deviations approach to phase diagrams for low temperature models of interacting bosons on complete graphs was discussed.

Future collaboration with host institution. A joint research program was set up and coordinated on the level of specific problems to be further investigated. A follow up visit of Balint Toth to Haifa was scheduled for January 2012.

Projected publications/articles to result from the grant. On the basis of preliminary results already obtained we expect that the research efforts will lead to 2-4 joint publications. Specifically, we hope to derive a closed form stochastic description of phase diagrams for quantum Heisenberg and transverse field Ising models on Cayley trees, a phase diagram for the Heisenberg model on generalized complete graphs and a phase diagram of a model of interacting bosons via a random walk representation and large deviation analysis of the latter.