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THE WEIZMANN INSTITUTE OF SCIENCE  
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE  
Geometric Functional Analysis and Probability Seminar

Room 290C ,Ziskind Building  
on Thursday, Jan 12, 2017at 11:00

Ran Tessler and Assaf Naor Ran Tessler (ETH), Assaf Naor (Princeton)

Double lecture !

Abstract:

**First Speaker: Ran Tessler (ETH)**

Time: 11:00

Title: A sharp threshold for Hamiltonian spheres in a random 2-complex.

Abstract: We define the notion of Hamiltonian sphere - a 2-complex homeomorphic to a sphere which uses all vertices. We prove an explicit sharp threshold for the appearance of Hamiltonian spheres in the Linial-Meshulam model for random 2-complexes. The proof combines combinatorial, probabilistic and geometric arguments. Based on a joint work with Zur Luria.

**Second Speaker: Assaf Naor (Princeton)**

Time: 12:00

Title: A new vertical-versus-horizontal isoperimetric inequality on the Heisenberg group, with applications to metric geometry and approximation algorithms

Abstract: In this talk we will show that for every measurable subset of the Heisenberg group of dimension at least 5, an appropriately defined notion of its "vertical perimeter" is at most a constant multiple of its horizontal (Heisenberg) perimeter. We will explain how this new isoperimetric-type inequality solves open questions in analysis (an endpoint estimate for a certain singular integral on  $W^{\{1,1\}}$ ), metric geometry (sharp nonembeddability into  $L_1$ ) and approximation algorithms (asymptotic evaluation of the performance of the Goemans-Linial algorithm for the Sparsest Cut problem). Joint work with Robert Young.