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Speaker: Assaf Naor

Title: Towards a calculus for non-linear spectral gaps.

Abstract: The spectral gap of a symmetric stochastic matrix is the reciprocal of the best constant in its associated Poincare inequality. This inequality can be formulated in purely metric terms, where the metric is Hilbertian. This immediately allows one to define the spectral gap of a matrix with respect to other, non-Euclidean, geometries: a standard procedure that is used a lot in embedding theory, most strikingly as a method to prove non-embeddability in the coarse category. Motivated by a combinatorial approach to the construction of bounded degree graph families, which do not admit a coarse embedding into any uniformly convex normed space (such spaces were first constructed by Lafforgue), we will naturally arrive at questions related to the behavior of non-linear spectral gaps under graph operations such as powering and zig-zag products. We will also discuss the issue of constructing base graphs for these iterative constructions, which leads to new analytic and geometric challenges.

Joint work with Manor Mendel