THE WEIZMANN INSTITUTE OF SCIENCE
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Geometric Functional Analysis and Probability Seminar

Room 290C, Ziskind Building
on Thursday, Feb 09, 2017
at 11:15

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The values of quadratic forms on difference sets, measure rigidity and equidistribution

Abstract:

Given a quadratic form Q in d variables over the integers, e.g. Q(x,y,z) = xy - z^2, and a set of positive density E in Z^d, we investigate what kind of structure can be found in the set Q(E-E).

We will see that if d >= 3, and Q is indefinite, then the measure rigidity, due to Bourgain-Furman-Lindenstrauss-Mozes or Benoist-Quint, of the action of the group of the symmetries of Q implies that there exists k >=1 such that k^2*Q(Z^d) is a subset of Q(E-E).

We will give an alternative proof of the theorem for the case Q(x,y,z) = xy - z^2 that uses more classical equidistribution results of Vinogradov, and Weyl, as well as a more recent result by Frantzikinakis-Kra. The latter proof extends the theorem to other polynomials having a much smaller group of symmetries. Based on joint works with M. Bjorklund (Chalmers), and K. Bulinski (Sydney).