İSTANBUL ANALYSIS SEMINARS

FOURIER QUASICRYSTALS AND LAGARIAS' CONJECTURE

Sergey Yu. FAVOROV

Kharkov National University
Department of Mechanics and Mathematics

Abstract: A Fourier quasicrystal is a pure point complex measure μ in $\mathbb{R}^p$ such that its Fourier transform in the sense of distributions $\hat{\mu}$ is also a pure point measure. For example, the sum μ of unit masses at the points of $\mathbb{Z}^p \subseteq \mathbb{R}^p$ is a Fourier quasicrystal, because $\hat{\mu}$ coincides with μ in this case.

There is a conjecture [1] that if supports of μ and $\hat{\mu}$ are both uniformly discrete sets, then the support of μ is a subset of a finite union of shifts of some full-rang lattice, and the support of $\hat{\mu}$ is a subset of a finite union of shifts of the conjugate lattice. This conjecture was proved in 2013 by N. Lev and A. Olevskii only for the cases of complex measures in $\mathbb{R}$ and for positive measures in $\mathbb{R}^p$, $p > 1$.

In my talk I will show that Lagarias' conjecture is not valid in the general case and discuss some connected results.

References

[1] J.C. Lagarias, "Mathematical quasicrystals and the problem of diffraction," in: *Directions in Mathematical Quasicrystals*, M. Baake and R. Moody (eds.), pp. 61–93. CRM Monograph Series, Vol. 13, Amer. Math. Soc., Providence, RI, 2000.

Date: December 26, 2014
Time: 15:40
Place: Sabancı University, Karaköy Communication Center
Bankalar Caddesi 2, Karaköy 34420, İstanbul

İstanbul Analysis Seminars is supported by TÜBİTAK.