Equiangular lines, spherical two-distance sets, and spectral graph theory

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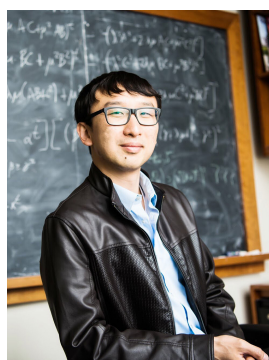## Massachusetts Institute of Technology

Aug. 6th (Thu) 10:00 - 11:00   Zoom ID: 668 824 17285   Password: 111317

Abstract: Solving a longstanding problem on equiangular lines, we determine, for each given fixed angle and in all sufficiently large dimensions, the maximum number of lines pairwise separated by the given angle. The answer is expressed in terms of spectral radii of graphs.

Generalizing to spherical two-distance sets, we conjecturally relate the problem to a certain eigenvalue problem for signed graphs, and solve it in a number of cases.

A key ingredient is a new result in spectral graph theory: the adjacency matrix of a connected bounded degree graph has sublinear second eigenvalue multiplicity.

Joint work with Zilin Jiang, Jonathan Tidor, Yuan Yao, and Shengtong Zhang (all MIT) https://arxiv.org/abs/1907.12466 https://arxiv.org/abs/2006.06633

Yufei Zhao is an assistant professor at Massachusetts Institute of Technology. He got his Ph.D. at MIT in 2015, under the supervision of Jacob Fox. Zhao's research interests include but not limited to combinatorics, discrete mathematics, and graph theory. He has received the Dénes König Prize in 2018, and a Sloan Research Fellowship in 2019.