

**Stanford University**  
**Departments of Mathematics and Statistics**

PROBABILITY SEMINAR

4:30pm, Monday, February 10, 2020  
Sequoia Hall Room 200

Refreshments served at 4pm in the Lounge.

**Speaker:** Alexander Volberg, *Michigan State University*

**Title:** Improving constant in  $L^1$  Poincaré inequality on Hamming cube and related subjects

**Abstract:**

We improve the constant  $\pi/2$  in  $L^1$ -Poincaré inequality on Hamming cube. For Gaussian space the sharp constant in  $L^1$  inequality is known, and it is the square root of  $\pi/2$  (Maurey–Pisier). For Hamming cube the sharp constant is not known, and the square root of  $\pi/2$  gives an estimate from below for this sharp constant. On the other hand, Ben Efraim and Lust-Piquard have shown an estimate from above:  $\pi/2$  without the square root. There are at least two other independent proofs of the same estimate from above. Since those proofs are very different from the proof of Ben Efraim and Lust-Piquard but gave the same constant, that might have indicated that their constant is sharp. But here we give a better estimate from above, showing that Poincaré constant  $C_1$  is strictly smaller than Ben Efraim and Lust-Piquard constant  $\pi/2$ .

It is still not clear whether  $C_1 > \sqrt{\pi/2}$ . The proof of Ben Efraim and Lust-Piquard used non-commutative harmonic analysis to prove their estimate. Our approach is different. We discuss this circle of questions, their relation with isoperimetric inequalities on Hamming cube and with Margoulis sharp threshold network theorem.