1137-47-103 **Jean Bourgain**, **Svetlana Jitomirskaya** and **Ilya Kachkovskiy*** (ikachkov@math.msu.edu).

*Localization and delocalization for two interacting 1D quasiperiodic particles.* Preliminary report.

The talk is about several tentative results, joint with J. Bourgain and S. Jitomirskaya. We consider a model of two 1D almost Mathieu particles with a finite range interaction. The presence of interaction makes it difficult to separate the variables, and hence the only known approach is to treat it as a 2D model, restricted to a range of parameters (both frequencies and phases of the particles need to be equal). In the usual 2D approach, a positive measure set of frequency vectors is usually removed, and extra care needs to be taken in order to keep the diagonal frequencies (which is a zero measure set) from being removed. We show that the localization holds at large disorder for energies separated from zero and from certain values associated to the interaction.

We also study the model in the regime of strong interaction, in which case an additional band of spectrum ("droplet band") is created. We show that this droplet band is localized in the regime of large interaction and fixed difference between phases (in particular, it covers the "physical" regime of equal phases). However, there is another regime where the difference between phases is close to pi/2, in which case the droplet band has some ac spectrum. (Received January 29, 2018)