

Семинар Лаборатории Алгебраической геометрии

и ее приложений

Семинар состоится в пятницу 16 февраля 2018 года.

Начало в 17:00.

Семинар будет проходить по адресу: ул. Усачева, д. 6,
аудитория 306

На семинаре выступит

**Alexey
Glutsyuk**

(CNRS, ENS de Lyon, HSE)

с докладом:



On polynomially integrable billiards on surfaces of constant curvature

Abstract: The famous Birkhoff Conjecture deals with convex bounded planar billiards with smooth boundary. Recall that a caustic of a planar billiard is a curve C such that each tangent line to C reflects from the boundary of the billiard to a line tangent to C . A billiard is Birkhoff caustic integrable, if an interior neighborhood of its boundary admits a foliation by closed caustics. The Birkhoff Conjecture states that every Birkhoff caustic integrable planar billiard is an ellipse. A very strong recent joint result of Vadim Kaloshin with Alphonso Sorrentino implies that every integrable perturbation of an ellipse is an ellipse. Birkhoff integrability is equivalent to the Liouville integrability of the billiard flow: existence of a first integral independent with the module of the speed. The algebraic version of the Birkhoff Conjecture, which was first studied by Sergey Bolotin at the beginning of 1990-ths, concerns polynomially integrable billiards, where the billiard flow admits a first integral polynomial in the speed that is non-constant on the unit level hypersurface of the module of the speed. In this talk we present a survey of the Birkhoff Conjecture and a complete solution of its algebraic version. Namely, we show that every polynomially integrable real bounded planar convex billiard with smooth boundary is an ellipse. We present a complete classification of piecewise-smooth and not necessarily convex polynomially integrable billiards on arbitrary two-dimensional surface of constant curvature: plane, sphere, hyperbolic plane. This is a joint result with Mikhail Bialy and Andrey Mironov. Its proof consists of two parts:

- two joint papers of Bialy and Mironov, where everything is reduced to a purely algebro-geometric problem that was partially studied by themselves;
- the preprint of the speaker, where the algebro-geometric problem is solved.

References:

- [1] Bialy, M., Mironov, A. Adv. in Math. 313 (2017), 102126.
- [2] Bialy, M., Mironov, A. J. Geom. Phys. 115 (2017), 150156.
- [3] Glutsyuk, A. Preprint <https://arxiv.org/abs/1706.04030>

Приглашаются все желающие!