

October 6, 2025, from 4:45 p.m. to 6:20 p.m. (Moscow time)
room 16-10 and broadcast via ZOOM

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*Liouville foliation of planar billiards
in magnetic and potential field*

In the last few years, the theory of integrable billiards has been greatly developed in many directions, including the study of their Liouville foliations. So, starting from the works of V.Dragović and M.Radnović on the study of elliptic billiard, V.V.Vedyushkina extended their results to an arbitrary elliptic-hyperbolic table, and then introduced the concept of a billiard book. This gives a significant extension of the class of billiard systems. Consequently, A.T.Fomenko proposed the hypothesis saying that any integrable system with two degrees of freedom is Liouville-equivalent to some billiard book. A weaker version of this hypothesis (on the realization of any base of foliation) was constructively proved by V.V.Vedyushkina and I.S.Kharcheva. Nevertheless, the construction is not sufficient to prove the stronger version of the hypothesis. It inspires us to generalize the concept of a billiard even further, by adding, for example, a potential or magnetic field.

The talk will present a series of works devoted to the study of the foliation of such billiards. The first part of the talk is devoted to potential. The restrictions imposed by integrability will be considered, isoenergetic Fomenko–Zieschang invariants will be calculated, bifurcation diagrams will be constructed and the behavior of singular values of the first integrals in the case of small orders of the potential will be established. The second part of the talk is devoted to magnetic topological billiards. Also Fomenko–Zieschang invariants will be calculated and bifurcation diagrams will be constructed.

**SCIENTIFIC SEMINAR
“DIFFERENTIAL GEOMETRY AND APPLICATIONS”**

headed by Academician of RAS Anatoly T. Fomenko

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