Does a billiard orbit determine its (polygonal) table?

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(joint work with Serge Troubetzkoy)

We consider a billiard transformation $T: V_P \subset \delta P \times [-\frac{\pi}{2}, \frac{\pi}{2}] \to V_P$, where $P$ is a polygon. We say that two polygons $P,Q$ are related if there are points $u_0 \in V_P, v_0 \in V_Q$ such that (\(\pi_1\) is the first natural projection)

- $\{\pi_1(T^n(u_0))\}_{n \geq 0} = \delta P, \{\pi_1(S^n(v_0))\}_{n \geq 0} = \delta Q$,
- the sequences $\{\pi_1(T^n(u_0))\}_{n \geq 0}, \{\pi_1(S^n(v_0))\}_{n \geq 0}$ have the same combinatorial order.

In this talk we will present several results on related polygons.