Open billiards, chaos and limit theorems

Leonid Bunimovich

(Georgia Institute of Technology)

E-mail: `leonid.bunimovich@math.gatech.edu`

Yaofeng Su

(Georgia Institute of Technology)

E-mail: `yaofeng.su@math.gatech.edu`

Abstract: Chaos is one of the important subjects in the theory of dynamical systems. In 1958, Kolmogorov made a discovery regarding the statistical properties exhibited by certain chaotic dynamical systems.

I will talk about the relationship between chaotic billiard systems and their statistical properties. More precisely, I will show that

(1) Poisson limit theorems can characterize chaotic behaviors of billiard systems

(2) The convergence rates of Poisson limit theorems and Zeta-Functions have certain connections.

References

[1] Bunimovich, L. & Su, Y. Poisson approximations and convergence rates for hyperbolic dynamical systems. *Comm. Math. Phys.*. **390**, 113-168 (2022), https://doi.org/10.1007/s00220-022-04309-w

[2] Bunimovich, L. & Su, Y. Maximal large deviations and slow recurrences in weakly chaotic systems. *Advances In Mathematics*. **432** pp. 109267 (2023), https://www.sciencedirect.com/science/article/pii/S0001870823004103

[3] Bunimovich, L. & Su, Y. Back to Boundaries in Billiards. *To Appear In Communications In Mathematical Physics*. pp. earXiv:2203.00785 (2022,3)