

Properties of Some Chaotic Billiards with Time-Dependent Boundaries

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A dispersing billiard (Lorentz gas) and focusing billiards (in the form of a stadium) with time-dependent boundaries are considered. The problem of a particle acceleration in such billiards is studied. For the Lorentz gas two cases of the time-dependence are investigated: stochastic perturbations of the boundary and its periodic oscillations. Two types of focusing billiards with periodically forced boundaries are explored: stadium with strong chaotic properties and a near-rectangle stadium. It is shown that in all cases billiard particles can reach unbounded velocities. Average velocities of the particle ensemble as functions of time and the number of collisions are obtained.

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