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Flash talk: Chaotic scattering in binary black hole systems

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When we consider the the case of chaotic scattering in a region described by a potential or a massive object, we see that the behavior of particle trajectories are heavily dependent on initial conditions, which eventually decide whether particles stay in the scattering region or exit it through different exits. Initially, the Henon-Heiles potential is taken as a model to study these trajectories, where we can find that a scaling relation exists between the fraction of particles trapped in the potential as function of relativistic parameter β , when each of these particles are projected with a different set of initial conditions. We then try to investigate if similar scaling relations could be found for null geodesics propagating around a binary black hole system described by the Majumder-Papapetrou (MP) binary black hole solution. Our study can thus be able to demonstrate the use of nonlinear dynamics to find such an example of the existence of scaling laws in gravitational systems.

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