Fractal traps and fractional dynamics

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Anomalous diffusion may arise in typical chaotic Hamiltonian systems. According to G.M. Zaslavsky's analysis, a description can be done by means of fractional kinetics equations. However, the dynamical origin of those fractional derivatives is still unclear. In this talk we study a general Hamiltonian dynamics restricted to a subset of the phase space. Starting from R. Hilfer's work, an expression for the average infinitesimal evolution of trajectories sets is given by using Poincaré recurrence times. The fractal traps within the phase space which are described by G.M. Zaslavsky are then taken into account, and it is shown that in this case, the derivative associated to this evolution may become fractional, with order equal to the transport exponent of the diffusion process.