Anomalous diffusion in Hamiltonian systems: noise perturbed and coupled maps

Anomalous diffusion appears in Hamiltonian systems due to the stickiness of chaotic trajectories to the border of ballistic islands, e.g, the accelerator modes of the standard map. We investigate in this poster the anomalous diffusion in two perturbations of this scenario: noise perturbed and globally coupled standard maps. We observe the existence of three different regimes of diffusion for small perturbations: (i) for small times the anomalous diffusion occurs as in the unperturbed map; (ii) for intermediate times an enhanced anomalous diffusion (tending to ballistic motion) exist due to the trapping of trajectories *inside* the regular region; (iii) asymptotical diffusion is normal, for noise perturbation and high dimensional standard maps. We deduce a non-trivial dependence of the diffusion coefficient D with the noise perturbation ξ, which differently from the case of $1-d$ maps, tends to $D \propto \xi^{-2}$ for small noise intensities. A new asymptotical anomalous regime is observed when few coupled maps are considered, due to the stickiness to higher dimensional tori. We have verified that the stickiness becomes less efficient for increasing number of maps, what suggests that in higher dimensional system the diffusion is asymptotically normal.