# ENTROPY, CHAOS AND WEAK HORSESHOE FOR INFINITE DIMENSIONAL RANDOM DYNAMICAL SYSTEMS

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In this talk, we present an answer to the long standing problem on the implication of positive entropy of a random dynamical system. We study $C^0$ infinite dimensional random dynamical systems in a Polish space, do not assume any hyperbolicity, and prove that chaos and weak horseshoe exist inside the random invariant set when its entropy is positive. This result is new even for finite dimensional random dynamical systems and infinite dimensional deterministic dynamical systems generated by either parabolic PDEs or hyperbolic PDEs. We mention that in general one does not expect to have a horseshoe without assuming hyperbolicity. For example, consider the product system of a circle diffeomorphism with an irrational rotation number and a system with positive entropy. This product system has positive entropy and a weak horseshoe, but has no horseshoe.

*Keywords:* Chaotical Behavior, positive entropy, compact random sets, random attractors, random dynamical systems, stochastic partial differential equations.