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Eventually always hitting sets in rapid mixing systems. Preliminary report.

In this work, joint with Dmitry Kleinbock and Florian Richter, we are studying a non-conventional shrinking target problem in the presence of rapid mixing. We consider the set of points whose long orbit segments eventually hit the corresponding shrinking targets for all future times and ask for criteria to determine whether it is a null or conull set. Even in the presence of total independence this set can behave erratically due to the involvement of extremal rather than mean statistics. For this reason we have focused on product and Bernoulli systems which exhibit perfect or near perfect mutual independence; our eventual goal is to get these conditions for the Gauss map and extract applications to a constrained Diophantine approximation problem. (Received September 26, 2017)