1077-37-1419 **Nicolai Haydn**, **Matthew Nicol*** (nicol@math.uh.edu), **Tomas Persson** and **Sandro Vaienti**. *A note on dynamical Borel-Cantelli lemmas for non-uniformly hyperbolic dynamical systems.*

Suppose (T, X, μ) is a dynamical system and (B_i) is a sequence of sets in X. We consider whether $T^i x \in B_i$ i. o.for μ a.e. $x \in X$. If $T^i x \in B_i$ i. o. for μ a.e. x we call the sequence (B_i) a Borel–Cantelli sequence. If the sets $B_i := B(p, r_i)$ are nested balls of radius r_i about a point p then the question of whether $T^i x \in B_i$ i. o. for μ a.e. x is often called the shrinking target problem.

We show, under certain assumptions on the measure μ, that for balls B_i if $\mu(B_i) \geq i^{-\gamma}$, $0 < \gamma < 1$, then a sufficiently high polynomial rate of decay of correlations for Lipschitz observables implies that the sequence is Borel–Cantelli. If $\frac{C_1}{i} \leq \mu(B_i) \leq \frac{C_2}{i}$ then exponential decay of correlations implies that the sequence is Borel–Cantelli. We give conditions in terms of return time statistics which quantitative Borel-Cantelli results for sequences of balls such that $\mu(B_i) \geq \frac{C}{i}$. Corollaries are that for Sinai planar dispersing billiards sequences of nested balls $B(p, 1/i)$ are Borel–Cantelli. We give applications to certain non-uniformly hyperbolic dynamical systems. (Received September 19, 2011)