1089-37-280 **Nicolai Haydn** (nhaydn@usc.edu), **Matthew Nicol*** (nicol@math.uh.edu), **Sandro Vaienti** (vaienti@cpt.univ-mrs.fr) and **Licheng Zhang** (xiyao.fei@gmail.com). *Central limit theorems for the shrinking target problem.*

Suppose $B_i := B(p, r_i)$ are nested balls of radius r_i about a point p in a dynamical system (T, X, μ). The question of whether $T^i x \in B_i$ i. o. for μ a.e. x is often called the shrinking target problem. In many dynamical settings it has been shown that if $E_n := \sum_{i=1}^{n} \mu(B_i)$ diverges then there is a quantitative rate of entry and $\lim_{n\to\infty} \frac{1}{E_n} \sum_{j=1}^{n} 1_{B_i}(T^i x) \to 1$ for μ a.e. $x \in X$. This is a self-norming type of strong law of large numbers. We establish self-norming central limit theorems (CLT) of the form $\lim_{n\to\infty} \frac{1}{a_n} \sum_{i=1}^{n} [1_{B_i}(T^i x) - \mu(B_i)] \to N(0, 1)$ (in distribution) for a variety of hyperbolic and non-uniformly hyperbolic dynamical systems, the normalization constants are $a_n^2 \sim E[\sum_{i=1}^{n} 1_{B_i}(T^i x) - \mu(B_i)]^2$. Dynamical systems to which our results apply include smooth expanding maps of the interval, Rychlik type maps, certain non-uniformly expanding maps of the interval and, in higher dimensions, piecewise expanding maps. (Received February 18, 2013)