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Dale Winter* (dale.alan.winter@gmail.com). *Spectral gap in homogeneous dynamics via smooth dynamical tools*. Preliminary report.

We'll be interested in hyperbolic manifolds $X = \Gamma \backslash \mathrm{SO}(n, 1) / \mathrm{SO}(n)$ for Γ a discrete subgroup, usually of infinite covolume. These objects are very often studied using the tools of homogeneous dynamics, and in particular using the representation theory of $\mathrm{SO}(n, 1)$. Unfortunately this approach has serious difficulties when Γ is very sparse (more precisely when the critical exponent $\delta(\Gamma) < (n - 1)/2$). I'll describe some of the efforts to fill this void, and some of the ideas from smooth dynamical systems that have gained traction. This is part of an intricate story that has been developed by many people and touches on areas as diverse as expander graphs, prime number theorems, sieve, and equidistribution of holonomies. (Received February 01, 2016)