1063-60-48 **Yuval Peres*** (peres@microsoft.com), Microsoft Research, 1 Microsoft Way, Redmond, WA 98052, and **James R. Lee**. *Rate of escape for random walks on groups.*

Consider simple random walk on a finite Cayley graph of degree d. We show that the mean square distance from the starting point at time t is at least $t/(2d)$ for all t up to $1/gap$, the inverse spectral gap. It is an open question whether the bound holds (perhaps with another constant in front) for t less than the mixing time. For infinite Cayley graphs this bound holds for all t, as first noted by Anna Erschler. We can prove the following refinement for infinite groups: the probability that the walk is within distance $\epsilon t^{1/2}$ from the starting point is $O(\epsilon)$, provided $t > \epsilon^{-8}$. All the proofs are based on Lipschitz embeddings of the Cayley graph in Hilbert space. (Received July 27, 2010)