

Abstract Submitted
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Excited Random Walk in One Dimension TIBOR ANTAL, SIDNEY REDNER, Boston University — We study the k -excited random walk, in which each site initially contains k cookies, and a random walk that is at a site that contains at least one cookie eats a cookie and then hops to the right with probability p and to the left with probability $q = 1 - p$. If the walk hops from an empty site, there is no bias. For the 1-excited walk on the half-line (each site initially contains one cookie), the probability of first returning to the starting point at time t scales as t^{-1-q} . We also derive the probability distribution of the position of the leftmost uneaten cookie in the large time limit. For the infinite line, the probability distribution of the position of the 1-excited walk has an unusual anomaly at the origin and the distributions of positions for the leftmost and rightmost uneaten cookie develop a power-law singularity at the origin. The 2-excited walk on the infinite line exhibits peculiar features in the regime $p > 3/4$, where the walk is transient, including a mean displacement that grows as t^ν , with $\nu > \frac{1}{2}$ dependent on p , and a breakdown of scaling for the probability distribution of the walk.

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