1062-05-107 **Boris G Pittel*** (bgp@math.ohio-state.edu), Boris Pittel, Columbus, OH 43221. *Tight Markov chains and random compositions.*

For an ergodic Markov chain $\{X(t)\}$ on $\mathbb{N}$, with a stationary distribution π, let $T_n > 0$ denote a hitting time for $[n]^c$, and let $X_n = X(T_n)$. Guy Louchard popularized a conjecture that, for $n \to \infty$, T_n is almost Geometric(p), $p = \pi([n]^c)$, X_n is almost stationarily distributed on $[n]^c$, and that X_n and T_n are almost independent, if $p(n) := \sup_i p(i, [n]^c) \to 0$ exponentially fast. For the chains with $p(n) \to 0$ however slowly, and with $\sup_{i,j} \|p(i,\cdot) - p(j,\cdot)\|_{TV} < 1$, we show that a stronger claim is true for the sequence of hits of any $S_n \subset \mathbb{N}$ with $\pi(S_n) \to 0$. The conditions are met by the Markov chains that arose in Louchard's studies of two random integer compositions. We show that the chains sharply approximate both compositions. Using a chain approximation and the approximation of the hit sequence for $[n]^c$, we study the largest parts of each of the compositions. (Received July 31, 2010)