1154-37-1333 **Matthew P Clay**, **Michael Hofbauer** and **Nandor J Simanyi*** (`simanyi@uab.edu`), 4014 University Hall, 1402 10th Avenue South, Birmingham, AL 35294-1241. *On the ergodicity of Wojtkowski's falling ball system.* Preliminary report.

We consider the system of n (≥ 2) point masses $m_1, \dots, m_n$ falling freely in the vertical half line $\left\{q \middle| q \geq 0\right\}$ (so that $0 \leq q_1 \leq q_2 \leq \cdots \leq q_n$) under constant gravitation and colliding with each other and the solid floor $q = 0$ elastically. In order to have a natural, invariant symplectic cone system, we asume that $m_1 \geq \cdots \geq m_n$, but not all masses are equal. One is interested the ergodic properties, like hyperbolicity, ergodicity, mixing, etc of such systems. We survey the existing results, pose some challenging open questions, and sketch a roadmap for proving ergodicity of such systems with $m_1 > m_n$. An important feature of this research is a thorough understanding of why such systems are, in fact, not isomorphic to any semi-dispersive billiard flow. Let A be the subset of the phase space containing all phase points for which all velocities are strictly positive. We proved that the flow-invariant hull of A belongs to a single ergodic component of the flow. Therefore, in order to prove ergodicity, it is enough to show that almost every trajectory enters A, sooner or later. (Received September 15, 2019)