1154-05-1628 **Atsuo Kuniba** (atsuo.s.kuniba@gmail.com), Tokyo, 153-8902, Japan, **Hanbaek Lyu*** (colourgraph@gmail.com), Los Angeles, CA 90025, and **Masato Okado** (okado@sci.osaka-cu.ac.jp), Osaka, 558-8585, Japan. *Large deviations and one-sided scaling limit of randomized box-ball system.*

The box-ball system (BBS) system is an integrable cellular automaton on one dimensional lattice, where each of the first n sites is occupied with a semistandard tableau of rectangular shape with fillings $\{0, 1, \cdots, \kappa\}$, and the time evolution is given by successive application of the combinatorial R. We analyze the limiting shape of the invariant Young diagrams when the initial configuration is randomized. In the large n limit, we show that the 'equilibrium shape' of the invariant Young diagrams are given by Schur polynomials, using two different methods of Markov chains and Thermodynamic Bethe Ansatz (TBA). Furthermore, in the special case where each site is occupied by a single ball of color in $\{0, 1, \cdots, \kappa\}$, we establish a large deviations principle for the row lengths of the invariant Young diagrams. As a corollary, they are shown to converge almost surely to the equilibrium shape at an exponential rate. (Received September 16, 2019)