1030-37-222 **Francois Ledrappier***, Department of Mathematics, University of Notre Dame, Notre Dame, IN 46637, and **Omri Sarig**, Department of Mathematics, The Pennsylvania State University, University Park, PA 16802. *Fluctuations of ergodic sums for horocycle flows on some infinite surfaces.*

We study the almost sure asymptotic behavior of the ergodic sums of integrable functions, for the infinite measure preserving system given by the horocycle flow on the unit tangent bundle of a $\mathbb{Z}^d$ cover of a hyperbolic surface of finite area, equipped with the volume measure. We prove rational ergodicity and a 'second order' ergodic theorem: almost sure convergence of properly renormalized ergodic sums, subject to a certain summability method (the ordinary pointwise ergodic theorem fails for infinite measur epreserving systems). (Received August 03, 2007)