THE RANDOM POLYMER APPROACH TO THE TRANSIENT PHASE OF THE VERTEX REINFORCED JUMP PROCESS

ALEXANDRE LEGRAND

We are interested in the transient phase of the Vertex Reinforced Jump Process (VRJP) in dimension $d \ge 3$. Sabot and Zeng (2019) have introduced a positive martingale and have shown that the VRJP is transient if and only if that martingale has a positive limit. In this talk we discuss the question of the L^p integrability of the VRJP martingale, which is related to the (diffusive) behavior of the VRJP. It turns out that this martingale can be interpreted as the partition function of a non-directed polymer in a very specific 1-dependent random potential: Therefore, taking inspiration from the work of Junk and Fukushima (2022, 2023) for the directed polymer model, we prove throughout the transient phase the L^p integrability, for some p>1, of the VRJP martingale on the half-space.