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**Interacting random walk in a dynamical random environment. II: Environment from the point of view of the particle.** (English) [Zbl 0818.60064](#)

Ann. Inst. Henri Poincaré, Probab. Stat. 30, No. 4, 559-605 (1994).

Summary: We consider, as in part I (see above), a random walk  $X_t \in \mathbb{Z}^\nu$ ,  $t \in \mathbb{Z}_+$ , and a dynamical random field  $\xi_t(x)$ ,  $x \in \mathbb{Z}^\nu$ , in mutual interaction with each other. The model is a perturbation of an unperturbed model in which walk and field evolve independently. Here we consider the environment process in a frame of reference that moves with the walk, i.e., the “field from the point of view of the particle”  $\eta_t(\cdot) = \xi_t(X_t + \cdot)$ . We prove that its distribution tends, as  $t \rightarrow \infty$ , to a limiting distribution  $\mu$ , which is absolutely continuous with respect to the unperturbed equilibrium distribution. We also prove that, for  $\nu \geq 3$ , the time correlations of the field  $\eta_t$  decay as  $\text{const} \cdot e^{-\alpha t}/t^{\nu/2}$ .

**MSC:**

**60G50** Sums of independent random variables; random walks

**60J10** Markov chains (discrete-time Markov processes on discrete state spaces)

Cited in **3** Reviews

Cited in **1** Document

**Keywords:**

random walk in random environment; mutual influence; environment from the point of view of the particle; random walk; interaction; perturbation; equilibrium distribution

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