Abstract: We study the asymptotic behavior of the simple random walk on oriented versions of $\mathbb{Z}^2$. The considered lattices are not directed on the vertical axis but unidirectional on the horizontal one, with centered random orientations which are positively correlated. We prove that the simple random walk is transient and also prove a functional limit theorem in the space $D([0, \infty], \mathbb{R}^2)$ of càdlàg functions, with an unconventional normalization.

Keywords: Markov chains, random environments, oriented graphs, associated random variables, recurrence vs transience, functional limit theorems.

AMS Subject Classification: 60K37 (primary), 60F17, 60K35.