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Hermine Biermé, Olivier Durieu and Yizao Wang* (yizao.wang@uc.edu), University of Cincinnati, Department of Mathematical Sciences, 2815 Commons Way, Cincinnati, OH 45221-0025. *Phenomena of critical regimes in invariance principles for operator-scaling Gaussian random fields*. Preliminary report.

Hammond and Sheffield introduce a model of correlated random walk that scales to a fractional Brownian motion with long-range dependence. In this paper, we consider a natural generalization of this model in higher dimension. We define a Z^d -indexed random field with dependence relations governed by an underlying random graph, and we study the scaling limit properties of its partial sums. An interesting phenomenon appears: under different regimes of summation, several kinds of limit fields could be reached. There is a critical regime where the limit field is an operator scaling process that inherits of the full structure of the discrete model, whereas it is not the case under other regimes. (Received January 14, 2015)