# Random Distance Graphs vs Inhomogeneous Random Graphs

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We consider random graphs on the set of vertices $[0, \dots, N)^d$ placed on the discrete $d$-dimensional torus. The edges between pairs of vertices are independent, and the probability of an edge between two vertices is a function of the distance between them, typically a non-increasing one. Hence, the number of the vertices of a graph is intrinsically coupled and scaled with the probabilities of connections. This model interpolates between inhomogeneous random graphs and percolation models on $d$-dimensional lattices or on $R^d$. We describe a class of such models which exhibit phase transition in the size of the largest connected component, similar to the one in the classical random graph model. This extends the theory of inhomogeneous graphs to a somewhat broader class of models.