PERCOLATION PHASE TRANSITION IN WEIGHT-DEPENDENT RANDOM CONNECTION MODELS

LUKAS LÜCHTRATH (U. KÖLN)

Abstract. We investigate a large class of weighted random graphs on the points of a Poisson process in d-dimensional space, which combine scale-free degree distributions and long-range effects. Given the weight and position of the points, an edge between any pair of points is formed independently with a probability depending on the two weights of the points and their distance. We give preferences to short edges and connections to vertices with large weights. We consider natural examples for such random graphs and show that there exists a parameter regime where no subcritical phase for these graphs exists. We show that this can only happen if a sufficiently small power law exponent of the degree distribution is combined with a strong long range effect showing the significant effect of clustering to the graphs' topology. In other words, we fully characterize the parameter regime where there is a non-trivial percolation phase transition and show how it depends on the degree distribution as well as on geometric model parameters.

The talk is based on joint work with Peter Gracar and Peter Mörters.