SHARPNESS OF THE PHASE TRANSITION FOR CONTINUUM PERCOLATION IN THE PLANE

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We study the phase transition of the random radii Poisson Boolean model: around each point of a planar Poisson Point Process, we draw a ball of random radius $R > 0$, independently for each point. The behaviour of this process is well known when the radius R is deterministic and equal to 1. In this talk, we investigate the behaviour of the process for heavy tailed radii distributions. Under the assumption of finite variance on the radii distribution, we establish the box-crossing property at criticality, implying that no unbounded component can be found, neither occupied nor vacant. Away from criticality, we show that the probability of crossing a box tends rapidly to either zero or one, depending on the regime. In the super-critical regime this implies the existence of an unbounded occupied component, whereas in the sub-critical regime, we prove the existence of an unbounded vacant component. This talk is based on a joint work with Daniel Ahlberg and Augusto Teixeira.