A universal behavior in Divide-and-Color percolation.

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Abstract:
We study Divide-and-Color percolation on a planar lattice G, defined as follows. First, sample a Bernoulli bond percolation at a subcritical parameter p<pc(G). This yields a random partition of V into finite clusters; we say that two clusters at distance 1 from each other are adjacent. In a second step, assign one color to each cluster independently of the others. The color is chosen to be black with probability r and white with probability 1-r. For fixed p<pc(G), we observe an infinite path of adjacent black clusters, as soon as the parameter r exceeds a critical density rc(p). We prove that on the square lattice rc(p) converges to 1/2 when p tends to pc(G). This result solves a conjecture due to Beffara and Camia and is related to the universality of critical planar percolation.