

CROSSING EXPONENT OF THE BROWNIAN LOOP SOUP

ANTOINE JEGO

We study the clusters of loops in a Brownian loop soup in some bounded two-dimensional domain with subcritical intensity $\theta \in (0, 1/2]$. We obtain an exact expression for the asymptotic probability of the existence of a cluster crossing a given annulus of radii r and rs as $r \rightarrow 0$ ($s > 1$ fixed). Relying on this result, we then show that the probability for a macroscopic cluster to hit a given disc of radius r decays like $|\log r|^{-1+\theta+o(1)}$ as $r \rightarrow 0$. Finally, we characterise the polar sets of clusters, i.e. sets that are not hit by the closure of any cluster, in terms of $\log\alpha$ -capacity.