Asymptotics of the critical parameter for level set percolation of the Gaussian free field

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Abstract:
We consider the Gaussian free field in $\mathbb{Z}^d$, $d \geq 3$. It is known that there exists a non-trivial phase transition for its level set percolation; i.e., there exists a critical parameter $h_*(d) \in [0, \infty)$ such that for $h < h_*(d)$ the excursion set above level h does have a unique infinite connected component, whereas for $h > h_*(d)$ it consists of finite connected components only.

We investigate the asymptotic behavior of $h_*(d)$ as $d \to \infty$ and give some ideas on the proof of this asymptotics.
(Joint work with P.-F. Rodriguez)