

Critical two-point functions for long-range self-avoiding walk in high dimensions

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Abstract

We consider long-range self-avoiding walk on \mathbb{Z}^d that is defined by power-law decaying pair potentials of the form $D(x) \asymp |x|^{-d-\alpha}$ with $\alpha > 0$. The upper-critical dimension d_c is $2(\alpha \wedge 2)$. In this talk, I present that for $d > d_c$ (and the spread-out parameter sufficiently large), and $\alpha \neq 2$, the Green function $G(x)$ is asymptotically $C|x|^{\alpha \wedge 2 - d}$, where the constant $C \in (0, \infty)$ is expressed in terms of lace-expansion coefficients and exhibits crossover between $\alpha < 2$ and $\alpha > 2$.

Keywords: self-avoiding walk, long-range interaction, Green function, Lace expansion, asymptotic behavior, critical behavior.