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

Lung-Chi Chen (陳隆奇)
Department of Mathematics, Fu-Jen Catholic University

We consider long-range self-avoiding walk on $\mathbb{Z}^d$ that are 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 $2(\alpha \wedge 2)$. Let $\alpha \neq 2$ and assume certain heat-kernel bounds on the n-step distribution of the underlying random walk. In this talk, I present that for $d > d_c$ (and the spread-out parameter sufficiently large), the critical two-point function $G_{P_c}(x)$ is asymptotically $C|x|^{\alpha \wedge 2-d}$, where the constant $C \in (0, \infty)$ is expressed in terms of the model-dependent lace-expansion coefficients and exhibits crossover between $\alpha < 2$ and $\alpha > 2$.