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On annealed elliptic Green's function estimates. (English) Zbl 1374.35385

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Summary: We consider a random, uniformly elliptic coefficient field a on the lattice $\mathbb{Z}^d$. The distribution $\langle\cdot\rangle$ of the coefficient field is assumed to be stationary. *T. Delmotte* and *J.-D. Deuschel* [Probab. Theory Relat. Fields 133, No. 3, 358–390 (2005; Zbl 1083.60082)] showed that the gradient and second mixed derivative of the parabolic Green's function $G(t,x,y)$ satisfy optimal annealed estimates which are L^2 and L^1, respectively, in probability, i.e., they obtained bounds on $\langle|\nabla_x G(t,x,y)|^2\rangle^{1/2}$ and $\langle|\nabla_x\nabla_y G(t,x,y)|\rangle$. In particular, the elliptic Green's function $G(x,y)$ satisfies optimal annealed bounds. In their recent work, the authors extended these elliptic bounds to higher moments, i.e., L^p in probability for all $p<\infty$. In this note, we present a new argument that relies purely on elliptic theory to derive the elliptic estimates for $\langle|\nabla_x G(x,y)|^2\rangle^{1/2}$ and $\langle|\nabla_x\nabla_y G(x,y)|\rangle$.

MSC:

35Q55 NLS equations (nonlinear Schrödinger equations)
35A01 Existence problems for PDEs: global existence, local existence, non-existence

Keywords:

stochastic homogenization; elliptic equation; Green's function on $\mathbb{Z}^d$; annealed estimate

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