A simple fluctuation lower bound for a disordered massless random continuous spin model in d=2

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Abstract

We prove a finite volume lower bound of the order square root of log N on the delocalization of a disordered continuous spin model (resp. effective interface model) in d=2 in a box of size N. The interaction is assumed to be massless, possibly anharmonic and dominated from above by a Gaussian. Disorder is entering via a linear source term. For this model delocalization with the same rate is proved to take place already without disorder. We provide a bound that is uniform in the configuration of the disorder, and so our proof shows that disorder will only enhance fluctuations.

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