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Geometrically disordered network models, quenched quantum gravity, and critical behavior at quantum Hall plateau transitions ILYA GRUZBERG, The Ohio State University, ANDREAS KLÜMPER, WIN NUDING, Bergische Universität Wuppertal, ARA SERDAKYAN, Yerevan Physics Institute — Recent results for the critical exponent of the localization length at the integer quantum Hall transition (IQHT) differ considerably between experimental ($\nu_{exp} \approx 2.38$) and numerical ($\nu_{CC} \approx 2.6$) values obtained in simulations of the Chalker-Coddington (CC) network model. The difference is at least partially due to effects of the electron-electron interaction present in experiments. Here we propose a mechanism that changes the value of ν even within the single-particle picture. We revisit the arguments leading to the CC model and consider more general networks with structural disorder. Numerical simulations of the new model lead to the value $\nu \approx 2.37$. We argue that in a continuum limit the structurally disordered model maps to free Dirac fermions coupled to various random potentials (similar to the CC model) but also to quenched two-dimensional quantum gravity. This explains the possible reason for the considerable difference between critical exponents for the CC model and the structurally disordered model. We extend our results to network models in other symmetry classes.

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