Random quantum magnets in $d \geq 2$ dimensions: critical behavior and entanglement entropy

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Using the strong disorder renormalization group method, we study numerically the quantum critical behavior of the random transverse-field Ising model in $d = 2$, 3 and 4 dimensions. In all cases the critical behavior is controlled by an infinite disorder fixed point and the critical exponents in the bulk, as well as at a free surface, corner and edge are disorder independent. The entanglement entropy satisfies the area law to which there are universal logarithmic corrections at the critical point due to corners.