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Entanglement entropy of random quantum critical points in one dimension GIL REFAEL, KITP, UC Santa Barbara, JOEL E. MOORE, UC Berkeley — For quantum critical spin chains without disorder, it is known that the entanglement of a segment of N>>1 spins with the remainder is logarithmic in N with a prefactor fixed by the central charge of the associated conformal field theory. We show that for a class of strongly random quantum spin chains, the same logarithmic scaling holds for mean entanglement at criticality and defines a critical entropy equivalent to central charge in the pure case. This effective central charge is obtained for Heisenberg, XX, and quantum Ising chains using an analytic real-space renormalization group approach believed to be asymptotically exact. For these random chains, the effective universal central charge is characteristic of a universality class and is consistent with a c-theorem.

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