Critical properties of superconducting quantum phase transition in disordered Dirac fermion systems

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We study critical properties of the s-wave superconducting quantum phase transition in N flavor Dirac fermion systems in the presence of quenched short-range correlated disorder. To avoid runaway renormalization group flows we work in the double $(\epsilon, \epsilon_\tau)$ expansion. A new disordered fermionic quantum critical point with non-trivial dynamic critical exponent is found for $N > 1$. For $N > 6$ this QCP is of a focus type, which entails oscillatory corrections to scaling laws.