Rounding of a first order quantum phase transition to a quantum critical point[1] PALLAB GOSWAMI, DAVID SCHWAB, SUDIP CHAKRAVARTY, University of California, Los Angeles — We give a heuristic argument for disorder rounding of a first order quantum phase transition into a continuous phase transition. From both weak and strong disorder analysis of the the N-color quantum Ashkin-Teller model in one spatial dimension, we find that for $N \geq 3$, the first order transition is rounded to a continuous transition and the physical picture is the same as the random transverse field Ising model for a limited parameter regime. The results are strikingly different from the corresponding classical problem in two dimensions where the fate of the renormalization group flows is a fixed point corresponding to N-decoupled pure Ising models.

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