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Rounding the First-Order Quantum Phase Transitions by Disorder in the Quantum Ashkin-Teller Model AHMED K. IBRAHIM, THOMAS VOJTA, Missouri University of Science and Technology — We study the influence of quenched disorder on the quantum phase transitions in the two-dimensional three-color quantum Ashkin-Teller model by Monte Carlo simulations. We show that in the weak-coupling regime the quenched disorder rounds the first-order quantum phase transition to a second-order one. This agrees with the predictions of a strong-disorder renormalization group analysis. However, in the strong-coupling regime there are two distinct transitions separating the paramagnetic, product and Baxter (ferromagnetic) phases.

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