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Devil's staircases, quantum dimer models, and stripe formation in strong coupling models of quantum frustration. KUMAR RAMAN, STEFANOS PAPANIKOLAOU, EDUARDO FRADKIN, University of Illinois at Urbana-Champaign — We construct a two-dimensional microscopic model of interacting quantum dimers that displays an infinite number of periodic striped phases in its T=0 phase diagram. The phases form an incomplete devil's staircase and the period becomes arbitrarily large as the staircase is traversed. The Hamiltonian has purely short-range interactions, does not break any symmetries, and is generic in that it does not involve the fine tuning of a large number of parameters. Our model, a quantum mechanical analog of the Pokrovsky-Talapov model of fluctuating domain walls in two dimensional classical statistical mechanics, provides a mechanism by which striped phases with periods large compared to the lattice spacing can, in principle, form in frustrated quantum magnetic systems with only short-ranged interactions and no explicitly broken symmetries. Please see cond-mat/0611390 for more details.

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