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New quantum phases in spin ladders with ring exchange and frustration[1] ALEXANDROS METAVITSIADIS, Univ. Braunschweig, Germany, SEBASTIAN EGGERT, Univ. Kaiserslautern, Germany — The ground state properties of spin-1/2 ladders are studied, emphasizing the role of frustration and ring exchange coupling. We present a unified field theory for ladders with general coupling constants and geometry. Rich phase diagrams can be deduced by using a renormalization group calculation for ladders with in–chain next nearest neighbor interactions and plaquette ring exchange coupling. In addition to established phases such as Haldane, rung singlet, and dimerized phases, we also observe a surprising instability towards an incommensurate phase for weak interchain couplings, which is characterized by an exotic coexistence of self-consistent ferromagnetic and antiferromagnetic order parameters.

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