



Phase Diagram of the $S = \frac{1}{2}$ Frustrated Coupled Ladder System

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We present a theoretical study of the magnetic phase diagram of the frustrated coupled ladder structure realized recently in several materials. This system displays a nondegenerate spin-gap state in the dimer limit and an infinitely degenerate spin-gap state in the regime of weakly-coupled zig-zag chains. Between these we demonstrate the existence of gapless, magnetically ordered regions whose order is antiferromagnetic close to the honeycomb lattice limit, and incommensurate along the chains when all three magnetic interactions compete.

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