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Ground state and finite temperature behavior of 1/4-filled zigzag ladders¹ R. TORSTEN CLAY, JEONG-PIL SONG, SAURABH DAYAL, Mississippi State University, SUMIT MAZUMDAR, University of Arizona — We consider the simplest example of lattice frustration in the $\frac{1}{4}$ -filled band, a one-dimensional chain with next-nearest neighbor interactions. For this zigzag ladder with electron-electron as well as electron-phonon interactions we present numerical results for ground state as well as thermodynamic properties. In this system the ground state bond distortion pattern is independent of electron-electron interaction strength. The spin gap from the ground state of the zigzag ladder increases with the degree of frustration. Unlike in one-dimension, where the spin-gap and charge ordering transitions can be distinct, we show that in the ladder they occur simultaneously. We discuss spin gap and charge ordering transitions in $\frac{1}{4}$ -filled materials with one, two, or three dimensional crystal structures. We show empirically that regardless of dimensionality the occurrence of simultaneous or distinct charge and magnetic transitions can be correlated with the ground state bond distortion pattern.

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