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Thermodynamic Properties of Ising Spins on the Triangular Kagomé Lattice[1] BILIN ZHUANG, COURTNEY LANNERT, Wellesley College, Wellesley, MA 02481 — The triangular Kagomé lattice can be constructed by inserting a lattice site on each bond of the Kagomé lattice. Each unit cell contains 6 a-sites, 3 $b-$sites, 6 aa-bonds and 12 ab-bonds. The lattice with antiferromagnetic aa-bonds is known to exhibit geometrical frustration at low temperatures. We applied analytical methods and Monte Carlo simulations to study a system of Ising Spins on the lattice and investigated its thermodynamics properties. In particular, the heat capacity of the model exhibits interesting features based on the strength and the sign of coupling constants J_{aa} and J_{ab}. In the case when the aa-interaction is antiferromagnetic, the heat capacity shows two broad peaks at $kT/|J_{ab}| \cong 1.8$ and at $kT/|J_{aa}| \cong 1.8$. In the case when the aa-interaction is ferromagnetic, the heat capacity shows a sharp peak at $kT/|J_{ab}| \cong 1.9$ and another low broad peak at around $kT/|J_{aa}| \cong 1.4$. We also studied a much simpler system of two $a-$trimers connected with $b-$sites to reproduce the thermodynamics behaviors of the more complicated triangular Kagomé lattice and to further understand the origin of its interesting properties.

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