Thermodynamics of frustrated Heisenberg magnets on the kagome and pyrochlore lattices: Green's function approach and high-temperature expansion

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Heisenberg models on highly frustrated lattices are in the focus of many theoretical studies. While there are numerous studies of the ground state of the kagome and pyrochlore lattices, much less is known about the thermodynamic properties. We use the spin-rotation invariant Green's function method [1–5] as well as the high-temperature expansion up to order 13 [6] to study the temperature dependence of the magnetic structure factor $S_{\mathbf{Q}}$, the uniform susceptibility χ_0, the specific heat C_V, the correlation length ξ_Q and the correlation functions $\langle S_{\mathbf{0}} S_{\mathbf{R}} \rangle$ for $S \geq 1/2$ of the Heisenberg antiferromagnet on the kagome [4] and pyrochlore [5] lattices as well as the Heisenberg ferromagnet [3] on the pyrochlore lattice for arbitrary spin quantum number S.

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