QUANTUM TRANSFER MATRIX STUDY OF THE SPIN-PEIERLS COMPOUND $\mathbf{CuGeO_3}$

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9.7 cm

Thermodynamical properties of one-dimensional S=1/2 Heisenberg model with dimerized nearest and uniform next-nearest neighbour interactions are studied by the numerically exact quantum transfer matrix method and the results are applied to $CuGeO_3$. Suzuki-Trotter formula is used to obtain a classical system with spin σ=3/2 and effective interactions between nearest neigbours only. Magnetic susceptibility curve is calculated and compared with experimental results performed in a wide temperature range, revealing the presence of frustration in the model proposed for $CuGeO_3$. Temperature dependence of the dimerization parameter below the spin-Peierls transition point is also estimated.

13.4 cm

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