THE GROUND STATE OF QUANTUM SPIN HALF HEISENBERG ANTIFERROMAGNETS

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The ground state properties of the spin half Heisenberg antiferromagnets (HAFM) on the 11 two-dimensional uniform Archimedean lattices have been investigated. These lattices are the prototypes of 2D arrangements of spins and vary in their geometrical and topological properties. Ground states of HAFMs on bipartite and frustrated lattices have been found in a short-range Resonating Valence Bond (SRRVB) basis to answer the question whether such states and low-temperature physics in such systems may be properly described in this basis. The SRRVB states have two important properties: they are not linearly independent and not orthogonal. The SRRVB basis is also over-complete. The numerical calculations have been made for clusters up to 42 sites with boundary periodic conditions. Exact diagonalization method (LAPACK) has been used.

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