FOUR-SPIN ANTIFERROMAGNETS: BEYOND THE ROTATIONAL BAND MODEL

Wojciech Florek, Leonard A. Kaliszan
A. Mickiewicz University, Faculty of Physics
Umultowska 85, 61-614 Poznań, Poland

Nowadays synthesized magnetic molecules comprise several ($n > 10$) spins with relatively small spin number $s \leq 3$. In the case of antifrromagnetic couplings the rotational band model, satisfying the Landé interval rule, is frequently assumed to describe the thermodynamic properties of such a system. However, it can be shown that the *classical* Landé rule is not fulfilled in *quantum* spin systems besides some special cases. Among others, it is satisfied for four identical spins s placed in vertices of a tetrahedron, a square or a rhombus. To investigate influence of quantum effects we consider systems very close to those mentioned above: four spins s in vertices of a rectangle or an isosceles trapezium and three spins s in vertices of an equilateral triangle with a spin $\sigma \neq s$ in its centre. Also a ring of six small spins ($s = 1/2, 1$) is considered. In all these cases the thermodynamic properties can be easily determined, but we concentrate on *eigenstates* and spin-spin correlations.

9.7 cm

13.4 cm

Subject category :
2. Quantum and Classical Spin Systems

Presentation mode :
poster

Corresponding author :
Wojciech Florek

Address for correspondence :
A. Mickiewicz University, Faculty of Physics Umultowska 85, 61-614 Poznań, Poland

Email address :
florek@amu.edu.pl