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Anisotropic exchange interactions in pyrochlore magnets

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The methods of finite group theory are a powerful means of reducing the complexity of highly symmetric crystals such as the rare-earth pyrochlores. In these materials, the rare-earth ions are located at the vertices of a network of corner-sharing tetrahedra, an arrangement known as "geometric frustration". The family of rare-earth pyrochlores has a diverse membership which exhibit a variety of interesting magnetic phenomena, including spin ice, spin liquid and magnetically ordered states. Recently, there has been a great deal of effort to analyse many of these systems in terms of a single, general model containing four anisotropic exchange parameters. The application of this model to different materials will be discussed in this talk.

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