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Optical evidence for symmetry changes above the Néel temperature of KCuF3

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Abstract

We report on optical measurements of the 1D Heisenberg antiferromagnet KCuF3. The crystal-field excitations of the Cu2+ ions have been observed and their temperature dependence can be understood in terms of magnetic and exchange-induced dipole mechanisms and vibronic interactions. Above TN we observe a new temperature scale TS characterized by the emergence of narrow absorption features that correlate with changes of the orbital ordering as observed by Paolasini et al.. The appearance of these optical transitions provides evidence for a symmetry change above the Néel temperature that affects the orbital ordering and paves the way for the antiferromagnetic ordering. © 2008 The American Physical Society.

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