
Physics with neutrons 2

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Exercise sheet 8
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EXERCISE 8.1

Calculate the dispersion relation of a body-centered cubic antiferromagnet with G-type ordering (i.e. with antiferromagnetic coupling both in-plane and out-of-plane).

EXERCISE 8.2

Is the antiferromagnetic 2-spin- $1/2$ state $|\uparrow\downarrow\rangle$ an eigenstate of the Hamiltonian $\mathcal{H} = -J\vec{S}_1 \cdot \vec{S}_2$? If not, how can it be made into one? Is the ferromagnetic state $|\uparrow\uparrow\rangle$ an eigenstate?