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Magnon softening in exchange-coupled hard-soft nanocomposites
ALEXANDER BELEMUK, SIU TAT CHUI, University of Delaware — We study spin excitations of the fully aligned state for three-dimensional nanocomposites of exchange coupled hard (SmFeN) and soft (FeCo) phases. When the amount of soft phase is increased the energy of low-lying spin excitation is considerably softened and contains a contribution proportional to the anisotropy constant of the soft phase. The dipolar interaction further lowers the magnon energy and controls the spin wave gap at $\mathbf{k} = 0$, which closes when the amount of soft phase exceeds a critical value. With the addition of soft phase or increasing the temperature the system moves to another ground state characterized by a magnetization mismatch between spins of hard and soft phases.

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