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 $k = 0$, 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.