9.7 cm

THE ROLE OF OBLIQUE-TO-SURFACE DISPOSITION OF NEIGHBOURS IN THE EMERGENCE OF SURFACE AND SUBSURFACE SPIN WAVES IN MAGNETIC FILMS

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This work is aimed at a numerical investigation of the spin-wave energies and respective band structures throughout the two-dimensional Brillouin Zone in magnetic (cubic) thin films for the surface orientations *sc(110), bcc(110)* and *fcc(110)*. We apply the Heisenberg localized spin model assuming exchange nearest (NN) and next-nearest (NNN) neighbour interactions and elucidate the role of the geometrical disposition of the NN and NNN neighbourhoods in the emergence of surface (SSW) and subsurface (SSSW) spin-waves. The necessary condition for the emergence of SSW is found to require the bonds to be cut at the surface *obliquely* to the latter irrespective of whether these "oblique" interactions are of the NN or NNN type. The emergence of subsurface branches in the spectra of thin films is similarly due to the deficiency of ineractions with neighbours the position vectors of which are oblique to the film surface, but these "oblique" interactions have necessarily to be of the NNN type.

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