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Anisotropy and reorientation of magnetization in magnetic Ni films WENLI GUO, Central College, DUOLIANG LIN, University at Buffalo, CENTRAL COLLEGE COLLABORATION, UNIVERSITY AT BUFFALO COLLABORATION — A microscopic theory valid in the whole temperature range of interest and applicable to both "Fe-type" and "Ni-type" systems is developed to calculate the perpendicular spontaneous magnetization and various anisotropies of Ni films. The Hamiltonian is based on the Heisenberg model with the surface anisotropy, interface anisotropy, volume anisotropy and demagnetization included, in which the positive volume anisotropy is vital. The temperature and thickness dependence of various anisotropies as well as the thickness range for perpendicular remanence in magnetic Ni films are investigated by means of the Green function technique. The thickness-driven magnetization reorientation transition is found and two critical thickness for switching on and off the perpendicular magnetization in Ni films are obtained, in qualitative agreement with experiments. Furthermore, we find that the critical thickness is almost independent of temperature.

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