Domain wall motion on magnetic nanotubes

Landeros, P.

Núñez, Álvaro S.

In this paper the dynamical regimes of the motion of domain walls in magnetic nanotubes are studied theoretically. We compare results obtained with a simplified model of the magnetic energy with a detailed one that includes an exact treatment of the dipolar field. We demonstrate that the proper inclusion of dipolar effects changes qualitatively the mobility of a vortex domain wall driven by an applied magnetic field. We report that magnetic nanotubes display the characteristic phenomenology of domain wall motion: at low fields we find a steady motion with almost constant mobility (velocity/field) up to a critical field, where steady motion breaks out and a precessional motion appears. It is also found that the initial chirality of a vortex domain wall determines the dynamic regime of the motion near the Walker critical field.