Origin of Brown's coercive paradox in perfect ferromagnetic crystals

U. Hartmann

It is brought to evidence that Brown's coercive paradox results from the assumption that the shape of the crystal considered is ellipsoidal. The extremely large demagnetizing fields developed near sharp corners of a uniformly magnetized crystal cause the appearance of closure domains which serve as preexisting nuclei of the magnetization reversal process. Thus, the resulting coercive field of the crystal can be lowered by orders of magnitude from the postulated micromagnetic value. A direct experimental verification of this phenomenon is observed on highly perfect single-crystal iron whiskers.