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Magnetic Structure of Domain Walls in Atomic-Size Ferromagnetic Wires J.D. BURTON*, R. SABIRIANOV, Department of Physics, University of Nebraska-Omaha, S.S. JASWAL*, O. MRYASOV, Seagate Research, E. TSYMBAL, *Department of Physics and Astronomy, Center for Materials Research and Analysis, University of Nebraska-Lincoln — The magnetic structure of domain walls in confined geometries is different from that in bulk ferromagnets. In nanowires the domain wall width is generally strongly reduced and can be controlled by pinning. We perform *ab initio* electronic structure calculations for nanowires of Co and Ni using a tight-binding LMTO method in real space. We consider monatomic wires and wires of 4-fold-symmetry and investigate different types of the domain walls, i.e. Bloch, Neel and linear walls. The domain walls are modeled using constrained geometry with the fixed width of a noncolliner region between two semiinfinite ferromagnetic wires of uniform magnetization. The self-consistent calculations are performed assuming fixed directions of magnetic moments. We show that the local magnetic moments of Co and Ni atoms in nanowires of uniform magnetization are larger than those in the bulk, but are slightly reduced in the presence of the domain wall. Our attempt to model a collinear domain wall in Co nanowires shows a tendency to create an abrupt interface between regions of well defined magnetic moments with opposite orientations. Ni wires have a tendency to create a thin linear DW with substantially reduced local magnetic moments. This work is supported by Seagate Research Center, National Science Foundation and Nebraska Research Initiative.

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