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Spin-polarized ballistic transport in a thin superlattice of zincblende half metallic compounds CHING-YAO FONG, University of California, Davis, MEICHUN QIAN, University of California, Davis, WARREN PICKETT, University of California, Davis, CONDENSED MATTER THEORY GROUP TEAM — We examine theoretically ballistic conduction in a sample made of thin layers of zincblende half metals. The sample is a superlattice consisting of monolayers of GaAs and MnAs, a bilayer of CrAs, and a bilayer of GaAs. The approach is based on density functional theory with the generalized gradient approximation. The superlattice is found to have a half metallic character, and ballistic conduction of electrons within ~ 0.3 eV of the Fermi level will give nearly 100% spin-polarized conductance in the direction of the superlattice. Our calculated results suggest that a thin superlattice involving the MnAs and CrAs will be a good spintronic material and can be grown on GaAs substrate by molecular beam epitaxy.

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