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**Efficient spin injection from a ferromagent into a semicondutor** V. KARPAN, University of Twente, Enschede, The Netherlands, M. ZWIERZYCKI, Max-Planck-Institut fur Festkorperforschung, Stuttgart, Germany, P.J. KELLY, University of Twente, Enschede, The Netherlands — It has been proposed that the spin-dependence of the interface resistance between (001) bcc Fe and zinc blende semiconductors such as GaAs, InAs or ZnSe can be so large that direct spin injection should be possible. This would not contradict the conductivity mismatch analysis in which spin-dependent interface resistance is neglected. In PRB **67**, 092401 (2003) however, it was pointed out that even a modest amount of interface disorder would be sufficient to destroy the spin-dependence. We circumvent the problem entirely by inserting a buffer layer (BL) between Fe and InAs to prevent Fe minority-spin states coupling to the semiconductor directly while still preserving the transmission spin-polarization. We identify a very promising candidate BL and demonstrate by explicit calculation that it preserves the transmission polarization of the ideal epitaxial structure remarkably well. Disorder at the Fe—BL or at the BL—InAs interface are shown to have small effect on the large transmission polarization. The same BL is expected to work equally well for Fe—GaAs and Fe—MgO interfaces.

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