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Persistent interlayer coupling by an antiferromagnetic spacer above its Neel temperature (a Monte Carlo study) SEONGWEON PARK, CH. CARLSEN, G. SCHNEIDER, T.M. GIEBULTOWICZ, Oregon State University, H. KEPA, Institute of Experimental Physics, Warsaw, Poland — It has been demonstrated by neutron diffraction experiments[1] that if a thin film of antiferromagnetic (AFM) material of bulk Neel temperature T_N is placed between two AFM layers or between two ferromagnetic (FM) layers with much higher transition temperatures, then a short-range AFM ordering in the "sandwiched" layer may persist well above T_N, and it may maintain magnetic coupling between the two adjacent layers which are still in their ordered phase. We report MC simulations of exchange-coupled FM/AFM/FM trilayers with an even number (4, 6, or 8) of AFM monolayers. In these systems the magnetization vectors of the FM blocks are antiparallel, but an external magnetic field B tends to incline them toward its direction. By varying B, we investigated the strength of the interlayer coupling between the FM films. In a system with a spacer consisting of 4 AFM layers the FM blocks remain coupled even at temperatures 50% higher than T_N. We believe that such trilayers may be used for making new types of TMR sensors with "temperature-tunable" sensitivity to the magnetic field.

[1]J.A. Borchers et al., Phys. Rev. Lett. **70**, 1878 (1993).

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