In their Comment Kurz et al.\textsuperscript{1} point out that our previous linear-muffin-tin-orbital calculations using the atomic sphere approximation (LMTO-ASA),\textsuperscript{2} which discussed the possibly noncollinear magnetic structure of Mn monolayers adsorbed on Cu(111) substrates, lead to results at variance with their recent full-potential linearized-augmented-plane-wave (FP-LAPW) studies on triangular Mn monolayers.\textsuperscript{3} They also indicate that this discrepancy cannot be explained by the difference between the local-spin-density (LSD) treatment adopted in their work and the use of a generalized gradient approximation (GGA) in our work. This result is correct in principle, but not new. Two of us (D.H and J.H.) have recently published\textsuperscript{4} a detailed study of freestanding triangular Mn and Cr monolayers and of Mn and Cr films adsorbed on a Cu(111) substrate, based on a projector-augmented-wave (PAW) approach and arriving at similar conclusions.

The important point is that in these three papers, noncollinearity of the magnetization is treated on three different levels of approximation. In the sequence of increasing sophistication: (i) In the LMTO-ASA the spin-density has spherical symmetry within the overlapping atomic spheres, within each sphere the spin-quantization axis is fixed. (ii) In the FP-LAPW approach, the spin-quantization axis is fixed only within the almost touching muffin-tin-spheres. In the interstitial region the spin density is represented by an unconstrained vector field. (iii) The PAW method finally allows for a fully unconstrained description of the spin density throughout the system (fixed quantization axes have to be defined only for the compensation and augmentation charges described on spherical grids). Within the approximations (i) and (ii) the essential dynamical variable is the angle defining the direction of the local quantization axes at each atomic site relative to some reference axis; in the approach (iii) the dynamical variable is the fully unconstrained vector field of the magnetization density. The comparison of the results of Hobbs and Hafner\textsuperscript{1} for the magnetic energy differences of the noncollinear (NCL) and ferromagnetic (FM) states of Mn/Cu(111) monolayers relative to the row-wise antiferromagnetic ground state ($\Delta E = 69$ meV/atom for NCL, $\Delta E = 300$ meV/atom for FM) compares very well with the results of Kurz et al.\textsuperscript{1} ($\Delta E = 89$ and 296 meV/atom, respectively). The remaining small difference for the NCL phase is probably attributed to the different description of noncollinearity: in the approach adopted by Kurz et al., the direction of magnetization changes discontinuously near the midpoint of bonds where the muffin-tin spheres almost touch, whereas the results of Hobbs and Hafner demonstrate that at these points the magnetization density is nonvanishing (though small) and eventually directed perpendicular to the bond (see Fig. 9 in Ref. 4).

Finally we wish to add to the comments of Kurz et al. concerning the modeling of the triangular antiferromagnetic networks using Heisenberg models. Our earlier work includes a calculation of exchange interactions for up to third-nearest neighbors in two different collinear reference configurations. These results demonstrate (i) the rather long-range nature of the exchange interactions, and (ii) that the exchange interactions depend to a non-negligible degree on the configuration adopted by the surrounding magnetic moments (or, in other words, that exchange-pair interactions alone represent an oversimplification of the problem). Hence all spin models can merely give hints as to the possible magnetic configurations, but cannot be considered as realistic representations of these itinerant systems.

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