Neumaier *et al.* Reply: In the preceding Comment, V. K. Dugaev *et al.* [1] expand their theory of weak localization in ferromagnetic metals [2] to the case of a weak ferromagnet, i.e., when $M\tau_{\uparrow,\downarrow}<$ holds. Here, M is the spin splitting of the band, and $\tau_{\uparrow,\downarrow}$ is the momentum relaxation time of spin up and spin down electrons, respectively. V. K. Dugaev *et al.* correctly point out that with the parameters relevant for (Ga,Mn)As, $M = 30$ meV and $\tau_{\uparrow,\downarrow} = 6 \cdot 10^{-15}$ s, $M\tau_{\uparrow,\downarrow} \approx 0.3$ results. As a consequence, they suggest that Eq. (1) of our original manuscript [3] should be replaced by

$$\Delta G = g_s \frac{e^2}{hL}[(L_\phi^{-2} + L_M^{-2} + w^2/L_H^4)^{-1/2} - 3(L_\phi^{-2} + 4/3L_{SO}^{-2} + w^2/L_H^4)^{-1/2}], \tag{1}$$

where the extra term L_M^{-2} has been added which takes spin splitting into account via $L_M = \sqrt{D\hbar/M}$, with the diffusion constant D. The authors show that by tuning the value of L_M between 100 and 500 nm, the localization correction changes from the localization type to antilocalization. However, using a typical experimental value of $D \sim 8 \times 10^{-5}$ m^2/s, we obtain $L_M \sim 1$ nm for $M = 30$ meV. This L_M value is much too small to cause antilocalization: the localization correction is solely given by the second term in square brackets and antilocalization is suppressed. On the other hand, we can fit the experimental data to extract a value of M consistent with experiment. Now three fit parameters need to be taken into account where the original single value of $\tilde{L}_\phi^{-2}$ (see D. Neumaier *et al.* [3]) has to be replaced by $L_\phi^{-2} + L_M^{-2}$ with the modified phase coherence length L_ϕ^{-2}. Though the fit is no longer well defined, we can estimate the maximum value of L_M assuming that $L_\phi \rightarrow \infty$. For sample 2 of Ref. [3], we obtain $L_M <$ 150 nm and a corresponding M smaller than 2.3 μeV. This is 4 orders of magnitude smaller than the typical splitting of 30 meV in (Ga,Mn)As. This implies that also the magnetization is reduced by the same value. The saturation magnetization of the material used here is 18 kA/m, which corresponds to a slightly larger spin-splitting of 40 meV. Furthermore, we have no reason to believe that M of our wire samples is smaller than in bulk samples as magnetic properties like T_C (derived from the temperature dependence of the resistance which exhibits a characteristic maximum around T_C) or the anisotropic magnetoresistance are very similar to the ones observed in extended samples. Hence, no mechanism is available which causes L_M to be significantly larger than 1 nm.

The values of the dephasing length observed in our original Letter ($\tilde{L}_\phi = 150$–190 nm) were in good agreement with measurements of universal conductance fluctuations [4,5] and Aharonov-Bohm oscillations [6]. Hence, the dephasing length cannot be seen as a completely free-fitting parameter. Below, we will now keep this value fixed ($\tilde{L}_\phi = L_\phi$) and fit the experimental data with L_M and L_{SO} as free parameters. This is shown in Fig. 1 for all three samples. The fit parameters were $L_M = 300$ nm for all three samples, $L_{SO} = 85$ nm for samples 2 and 3, and $L_{SO} = 100$ nm for sample 2a. The values of L_ϕ were 150 nm (sample 2), 160 nm (sample 3), and 190 nm (sample 2a). With these values, the experimental data can be described quite well in the low-field region. Consequently, to fit the antilocalization, a value of $L_M =$ 300 nm is needed which corresponds to $M \sim 1.6$ μeV. A scenario as sketched by V. K. Dugaev *et al.* (strong fluctuations of local magnetization) should also leave its mark in the measured magnetization. This is not the case as pointed out above. Hence, the origin of the observed antilocalization feature still seems to be an unsolved mystery.

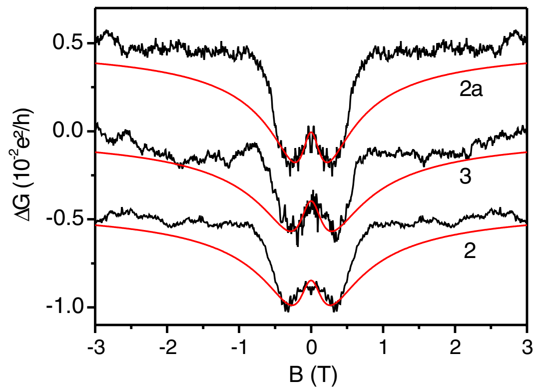

FIG. 1 (color online). Weak localization correction of 3 (Ga, Mn)As wire arrays and corresponding fits to Eq. (1). The parameters of the samples are given in [3]. The fitting parameters are given in the text.

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