Weidinger *et al.* Reply: In a recent paper[1] we showed that magnetic ordering exists in $La_{2-x}Sr_xCuO_4$ samples which are superconducting. We interpreted the data as evidence for the coexistence of superconductivity and magnetism in these samples. This interpretation was questioned by Harshman *et al.*[2] who argued that our samples are electronically inhomogeneous and that magnetic ordering and superconductivity occur in spatially separated regions.

The main argument against this two-phase hypothesis of Harshman *et al.* is that we find a continuous variation of the two relevant parameters, the transition temperature T_c and the internal magnetic field $\langle |B_\mu| \rangle$ with Sr concentration x. In the two-phase picture one would expect that T_c and $\langle |B_\mu| \rangle$ which are characteristic for the superconducting and the magnetic phase, respectively, remain more or less constant as x is varied and that only the volume fractions of the two phases change.

However, this is not what we observe. We rather find that T_c and $\langle |B_\mu| \rangle$ vary continuously and strongly with x. For example, the magnitude of the internal field changes by more than 1 order of magnitude if the Sr concentration is increased beyond $x=0.05$. This is not just an effect of short-range ordering compared to long-range ordering since short-range ordering sets in already at much lower Sr concentrations, i.e., around $x=0.02$. Thus the reduction of $\langle |B_\mu| \rangle$ must be an effect of a change in the electronic structure.

We believe that the density of charge carriers is the relevant parameter for both superconductivity and magnetism. A higher carrier concentration favors superconductivity (higher T_c) and suppresses magnetic ordering (lower $\langle |B_\mu| \rangle$). In an intermediate region of moderate charge carrier density, superconductivity and magnetic ordering can coexist.

Figure 1 shows an empirical relation which we found between the magnitude of the internal magnetic field and the superconducting transition temperature T_c. It can be seen that internal magnetic fields of reasonable size develop only for not too high transition temperatures. Assuming that T_c is related to the concentration of charge carriers, as was shown by measurements of the Hall coefficient,[3] internal magnetic fields should not exist in systems with large carrier concentrations as, e.g., in the 90-K superconductor $YBa_2Cu_3O_7$. In these systems we indeed did not find magnetic ordering.[1]

The authors of Ref. 2 criticize our procedure of background subtraction arguing that this could influence the quoted volume fraction for magnetic ordering. Our statement that more than 70% of all muons see an internal magnetic field is based on the absolute value of the asymmetry of the fast relaxing signal and uncertainties in the background subtraction are contained in the remaining 30%. Thus the procedure of background subtraction is not crucial for the main statement of the paper.

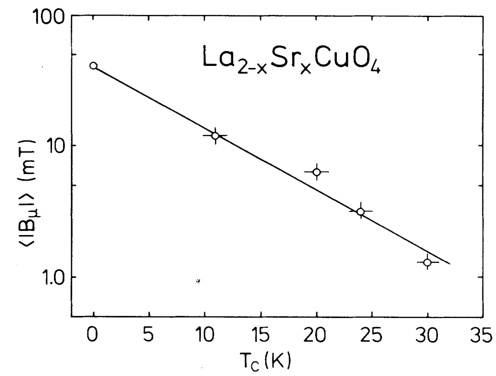

FIG. 1. Internal magnetic field $\langle |B_\mu| \rangle$ as a function of the superconducting transition temperature T_c (downset) for $La_{2-x}Sr_xCuO_4$ samples with different Sr content x. Also shown in this figure is the internal magnetic field of undoped La_2CuO_4 which is not superconducting.

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