Erratum

Light induced magnetic exchange-coupling

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The observation of light-induced exchange coupling across SiO reported in our paper unfortunately is based on an inaccurate temperature determination. We have studied the photon energy and intensity dependences of this apparent light sensitivity using a CO₂ laser. We now conclude that all effects of light irradiation on the coupling strength across SiO indeed must be attributed to sample heating.

The poor thermal conductivity of the amorphous magnetic substrate and its insufficient thermal contact with the head of the cryostat have caused large temperature gradients along the sample surface. We have measured these gradients with a small thermocouple attached directly beneath the illuminated area of the substrate. We find that with a light intensity of 1 W/cm² the sample temperature in the light spot is increased from 300 K to about 450 K and from 35 K to about 250 K, respectively. Using a modified sample holder which allows for controlled heating with a light source as well as with a filament we find that no measurable

exchange coupling can be induced by light illumination at constant sample temperature. The data shown in Figs. 2–4 of our paper all represent heat-induced coupling. The suppression of exchange at higher light intensities shown in Fig. 3 likewise has to be attributed to heating the overlayer towards its Curie temperature.

The interpretation of the effect of light irradiation in terms of photoelectric excitations must be replaced by one based on thermal excitations. However, heat-induced exchange across SiO still is an interesting new phenomenon which will be addressed in a separate publication (1). The general conclusion of our paper that defect states within the mobility gap mediate the magnetic coupling remains valid.

References

1. Briner, B., Landolt, M.: Z. Phys. (submitted for publication)