9.7 cm

ORIGIN OF THE MAGNETORESISTANCE IN Ca-DOPED YIG

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Recent experiments on anisotropic magnetoresistance in Ca^{2+} doped YIG have stimulated our detailed analysis of charge transport in the system. Our calculations show important role of the respective point symmetry in the determination of appropriate orbital states of the tetrahedral and octahedral iron-oxygen clusters, by LCAO-like procedure. Because of the Hubbard repulsion between holes in the same molecular orbital state, inappropriate spin orientation can block the charge transfer unless the hole gets excited to a higher-lying energy level. This explains not only an increase in the charge transfer with temperature, but also a reduction of the resultant magnetisation at lower temperatures. Moreover, the transfer probabilities turn out to be dependent on orientation of the external magnetic field due to an orbital contribution of the magnetic moment of the migrating hole.

[1] C. Srintiwarawong and G.A. Gehring, J. Phys.: Condens. Matter **13**, 7987 (2001).

[2] A. Lehmann-Szweykowska, R.J. Wojciechowski, J. Barnaś, and P.W. Wigen, Nato Science Series (in press) .

13.4 cm

Subject category :

3. Transition Metals, Alloys and Compounds

Presentation mode :
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