

Theoretical Investigations of the EPR g Factors for Er^{3+} in Pr_2CuO_4 Superconductor

Shao-Yi Wu^{a,b}, Hui-Ning Dong^{b,c}, and Peng Li^d

^a Department of Applied Physics, University of Electronic Science and Technology of China, Chengdu 610054, P. R. China

^b International Centre for Materials Physics, Chinese Academy of Sciences, Shenyang 110016, P. R. China

^c College of Electronic Engineering, Chongqing University of Posts and Telecommunications, Chongqing 400065, P. R. China

^d Department of Physics, The University of Hong Kong, Pokfulam Road, Hong Kong, P. R. China

Reprint requests to S.-Y.W.; E-mail: wushaoyi@netease.com

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The electron paramagnetic resonance g factors g_{\parallel} and g_{\perp} for Er^{3+} in the superconductor Pr_2CuO_4 are investigated by using the perturbation formulas of g factors for a $4f^{11}$ ion in tetragonal symmetry. In these formulas, the contributions to the g factors due to the second-order perturbation terms and the admixture of different states are considered. The crystal field parameters used in the calculations are obtained from the superposition model and the local structural parameters of the impurity Er^{3+} located on the host Pr^{3+} site. The superposition model parameters adopted in this paper are comparable with those for similar tetragonal Er^{3+} centers in some zircon compounds in previous work. The above investigations may be helpful to understand the electronic and magnetic properties and hence the superconductivity of the Er^{3+} doped Pr_2CuO_4 .

Key words: EPR; High- T_c Superconductor; Pr_2CuO_4 ; Crystal Field Theory; Er^{3+} .