Exchange and Crystal Field Effects in the ESR spectra of Eu$^{2+}$ in LaB$_6$

CARLOS RETTORI, JOSE DUQUE, Instituto de Física Gleb Wataghin, Universidade Estadual de Campinas, Campinas, SP, 13083-970, Brazil, RICARDO URBANO, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, PABLO VENEGAS, Dpto. de Física, Universidade Estadual Paulista - Unesp, CP 473, 17033-360, Bauru, SP, Brazil, PASCOAL PAGLIUSO, Instituto de Física Gleb Wataghin, Universidade Estadual de Campinas, Campinas, SP, 13083-970, Brazil, ZACHARY FISK, Department of Physics, University of California, Davis, CA 95616, U.S.A., SAUL OSEROFF, San Diego State University, San Diego, CA, 92182, U.S.A.

— The Electron Spin Resonance (ESR) spectra of Eu$^{2+}$ ($4f^7$, $S = 7/2$) in LaB$_6$ single crystal show a single Dysonian resonance for the localized Eu$^{2+}$ magnetic moments. It is shown that the Eu$^{2+}$ ions are covalent exchange coupled to the (B) 2$p$ - like host conduction electrons. The anisotropy of the ESR spectra is interpreted in terms of an averaged positive fourth order cubic crystal field parameter.

1Supported by FAPESP, CNPq, NSF-DMR, 0102235 and US DOE.