ELECTRONIC AND MAGNETIC PROPERTIES OF La$_{1-x}$Pr$_x$Pb$_3$ ALLOYS

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The low-temperature properties of La$_{1-x}$Pr$_x$Pb$_3$ alloys were studied experimentally in the last years [1-2]. For low concentration of Pr the quadrupolar Kondo effect was observed [2-3]. These systems have AuCu$_3$ type cubic crystal structure. In this work we have studied the electronic and magnetic properties of La$_{1-x}$Pr$_x$Pb$_3$ alloys for 0 < x < 1.0. The band structure was calculated by ab-initio FPLO-CPA [4-5] method in the local spin density approximation. The spin polarised band calculations were performed for the experimental lattice parameters. We have applied the full relativistic mode for LaPb$_3$ and PrPb$_3$ alloys, however in the case of the disordered systems we used the coherent potential approximation in the scalar-relativistic mode. The exchange correlation potential was assumed in the form of [6]. The spin polarised band calculations give the spin magnetic moment on Pr $m_{spin}=2.33\mu_B$ and the orbital magnetic moment $m_{orb}=-3.11\mu_B$.