de Haas-van Alphen study of the Fermi Surface of Ce$_x$La$_{1-x}$B$_6$ as a function of composition: the evolution of field-dependent quasi-particle effective masses

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The de Haas-van Alphen effect has been studied in single crystals of Ce$_x$La$_{1-x}$B$_6$ (0 ≤ $x$ ≤ 0.075) using pulsed magnetic fields of up to 60 T and temperatures 0.38 K ≤ $T$ ≤ 4.0 K. The low-field effective mass grows smoothly with increasing $x$. Moreover, for $x > 0$, the effective mass becomes a function of magnetic field, decreasing as the field rises. These results may be fitted using the extended Lifshitz-Kosevich formalism due to Wasserman, the decrease in mass reflecting the suppression of spin fluctuations by the field. The data also show that a previously-observed effect, attributed to complete spin polarization of one of the Fermi-surface sheets for $x ≥ 0.05$, is in fact an artifact of the field-dependent mass, ignored in previous works.