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Anderson-Kondo lattice: field-induced suppression of heavy-fermion state in ferromagnetic phase

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We apply the extended (statistically-consistent, SGA) Gutzwiller method to the periodic Anderson model in an applied magnetic field and in the strong correlation limit. We show that in ferromagnetic phases the low-energy single-particle states are strongly affected by the presence of the applied magnetic field. We also find that for large values of hybridization strength the system enters the so-called locked heavy fermion state. In this state the chemical potential lies in the majority-spin hybridization gap and as a consequence, the system evolution is insensitive to further increase of the applied field. However, for a sufficiently strong magnetic field, the system transforms from the locked state to the fully spin-polarized phase. This is accompanied by a metamagnetic transition, as well as by decrease of the effective mass of quasiparticles. In particular, we observe a reduction of effective mass enhancement in the majority-spin subband by as much as 20 % in the fully polarized state. The findings are consistent with experimental results for $Ce_xLa_{1-x}B_6$ compounds.