

# Abstract

The Kotliar-Ruckenstein slave-boson representation is applied to the periodic Anderson model to study the effects of strong electron correlations in homogeneous systems and superlattices. By using an alternative saddle point approximation, the paramagnetic solution for the symmetric case is analysed for different hybridization and interaction strengths ( $V$  resp.  $U$ ), and filling factors  $\mu$ . For moderate  $U$  and  $V \neq 0$ , one finds a hybridization gap in the dispersion of the superlattice electrons. As the correlations  $U$  are turned up, the hybridization effects between adjacent layers start to reduce, accompanied by a decreasing quasiparticle weight  $Z$ . At a critical value  $U_C$  the quasiparticle weight  $Z$  vanishes, leaving completely localized f-electron states and a strongly renormalized Fermi velocity  $v_F$ . At half filling, i.e.  $\mu = 0$ , the critical point lies approximately at  $U_C = 0.6$  for  $V = 0.15$  and at  $U_C = 2.25$  for  $V = 0.3$ .