Baryon Spectroscopy in the Charm and Beauty Sectors using a Renormalization Group Improved Quark Phenomenological Model

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Abstract

The model used in this calculation is based on the model of Kalman and Tran. That model which uses fewer parameters than any other model successfully reproduces the spectroscopy and decay rates of baryons in the uds sector. It is not as good in the b and c sectors, because it uses a fixed value of alpha(s). In this model the value of alpha(s) is taken as the experimental value at the Z mass and the values at all other scales are obtained using the renormalization group applied to quasi particles within the baryon. These quasi particles are excitations of the three-body baryon system which behave as two-body systems. Excellent agreement with experiment is achieved. Since an iterative procedure exists that aligns the model with that of Kalman and Tran in the uds sectors, this model is consistent over the entire baryon spectra.