WEINBERG-TYPE SUM RULES IN THE SIX QUARK MODELS

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A b s t r a c t:

We consider six-quark models with charge assignments (2/3,-1/3,-1/3,2/3,-1/3,2/3) for (u,d,s,c,b,t), respectively. The quarks are classified according to a 6-dimensional representation of U(6) and the electromagnetic current J_{μ}^{em} transforms as components of a regular tensor operator j^{α}, with α = 0,3,8,15,24,35. We are interested in electromagnetic properties of the vector mesons $\rho^{o},\omega,\phi,\Psi,T,\xi$ and, in particular, in the sum rules based on the symmetry breaking introduced via the spectral representation and VDM. Extensions of the Das-Mathur-Okubo sum rule are discussed and found incompatible with experiment. If, however, one uses a symmetry breaking mechanism with a modified Weinberg's first spectral function sum rule, one obtains a sum rule, which, supplemented by the assumption that heavy vector mesons each contain only a single quark-antiquark pair, is experimentally well satisfied. This sum rule can be viewed as the theoretical basis for a frequently used empirical rule which expresses a constant ratio between the leptonic pair vector meson decay width and squares of the quark charges. Indirectly it lends additional support for the quarkonium approach to the vector mesons.