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Light Hadron Spectrum from a Yang-Mills Matrix Model

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Abstract: The $SU(3)$ Yang-Mills matrix model coupled to fundamental fermions is an approximation of quantum chromodynamics (QCD) on a 3-sphere of radius R . The spectrum of this matrix model Hamiltonian is estimated using standard variational methods, and is analyzed in the strong coupling limit. By employing a renormalization prescription to determine the dependence of the Yang-Mills coupling and the bare quark masses on R , we relate the asymptotic values of the energy eigenvalues in the flat space limit to the masses of light hadrons. We find that the matrix model estimates the light hadron spectrum fairly accurately, with most masses falling within 15% of their observed values

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