Baryon Spectrum Analysis using Covariant Constraint Dynamics

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spectrum of the baryons is determined by treating each of them as a three-body
system with the interacting forces coming from a set of two-body potentials that
depend on both the distance between the quarks and the spin and orbital angular
momentum coupling terms. The Two Body Dirac equations of constraint dynamics
derived by Crater and Van Alstine, matched with the quasipotential formalism of
Todorov as the underlying two-body formalism are used, as well as the three-body
constraint formalism of Sazdjian to integrate the three two-body equations into a sin-
gle relativistically covariant three body equation for the bound state energies. The
results are analyzed and compared to experiment using a best fit method and sev-
eral different algorithms, including a gradient approach, and Monte Carlo method.
Results for all well-known baryons are presented and compared to experiment, with
good accuracy.

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