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Dirac's Covariant Constraint Dynamics Applied to the Baryon Spectrum JOSHUA WHITNEY, HORACE CRATER, University of Tennessee Space Institute — A baryon is a hadron containing three quarks in a combination of up, down, strange, charm, or bottom. For prediction of the baryon energy spectrum, a baryon is modeled as a three-body system with the interacting forces coming from a set of two-body potentials that depend on the distance between the quarks, the spin-spin and spin-orbit angular momentum coupling terms, and a tensor term. Techniques and equations are derived from Todorov's work on constraint dynamics and the quasi-potential equation together with Two Body Dirac equations developed by Crater and Van Alstine, and adapted to this specific problem by further use of Sazdjian's N-body constraints dynamics for general confined systems. Baryon spectroscopy results are presented and compared with experiment. Typically, a best fit method is used in the analyses that employ several different algorithms, including a gradient approach, Monte Carlo modeling, and simulated annealing methods.

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