

The search for glueballs

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While the Higgs mechanism might be responsible for the masses of the elementary particles, the mass-creation mechanism for hadrons is quite different. Less than 1% percent of the mass of the proton is due to the Higgs mechanism. Particles solely composed of gluons are at the center of the strong interaction. Glueballs themselves would be massless without the strong interaction and their predicted masses arise solely from the strong interaction. Glueballs thus offer a unique way to study the mass creation of strongly interacting particles. In the past years, a new relation between modern superstring theory and QCD has been developed by the AdS/CFT (Anti-de Sitter space/conformal field theory) correspondence. Several groups have studied in the Witten-Sakai-Sugimoto model of strings to investigate glueballs and their behavior. Modern stringy hadron models attempt not only to make predictions for glueballs but also describe and predict other hadronic states including their decay dynamics. This talk describes the experimental situation and the experimental perspectives to provide more information on glueballs and their structure.

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