Institut Henri Poincaré

11 rue Pierre et Marie Curie, 75231 Paris cedex 05

String Theory in Greater Paris

Rencontres Théoriciennes

“Supergravité, théorie des cordes et théorie M”

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Yifei He

École Normale Supérieure

Bootstrapping gauge theories (QCD)

We consider asymptotically free gauge theories with gauge group SU(Nc) and Nf quarks with mass mq < < LambdaQCD that undergo chiral symmetry breaking and confinement. We propose a bootstrap method to compute the S-matrix of the pseudo- Goldstone bosons (pions) that dominate the low energy physics. For the important case of Nc = 3, Nf = 2, a numerical implementation of the method gives the phase shifts of the S0, P1 and S2 waves in good agreement with experimental results. The method incorporates gauge theory information (Nc, Nf, mq, LambdaQCD) by using the form-factor bootstrap recently proposed by Karateev, Kuhn and Penedones together with a finite energy version of the SVZ sum rules. At low energy we impose constraints from chiral symmetry breaking. The only low energy numerical inputs are the pion mass and the quark and gluon condensates.

Institut Henri Poincaré, salle 314, 3ème étage