Contribution ID : **82** Type : **not specified**

Electromagnetic and hadronic form factors in renormalizable quantum field theories

Tuesday, 10 November 2009 17:50 (0:30)

Abstract content

Summary

Electromagnetic and hadronic form factors are calculated in two different renormalizable quantum field theories. Discussed first is the renormalizable Abelian theory of Kroll-Lee-Zumino, which provides the correct platform to justify and to extend beyond tree-level the Vector Meson Dominance Model. This is used at the next to leading order to obtain a parameter-free prediction for the electromagnetic form factor of the pion in both the space-like and the time-like region. It is also used to calculate the scalar radius of the pion to the same order; this radius fixes one of the low energy constants of chiral-perturbation theory. Second, the Dual Resonance Model inspired realization of QCD in the limit of an infinite number of colours (Dual QCD∞), is used to determine the pion, the nucleon, and the (1236) electromagnetic form factors in the space-like region. Finite width corrections are discussed and used to analytically continue the pion form factor into the time-like region.

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Session Classification : Hadron and LHC Physics II