The ρNN coupling with direct coupling and loops

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Starting from a gauge formalism of ρ mesons, pions and baryons we evaluate [1] the ρ coupling to the nucleon, including the direct coupling provided by the vector meson dominance Lagrangians [2], plus contributions from loops with the virtual pion cloud. We find a contribution to the magnetic ρ coupling to the nucleon from pionic loops of the same size as the direct coupling, which is, however, still small compared to the empirical values. This finding goes in line with chiral formulations of the strong interaction of mesons at low energies where, unlike the scalar mesons which are mostly built of a pion (kaon) cloud, the ρ meson stands as a genuine QCD state with intrinsic properties not tied to those of the pion cloud. The diagrams considered are shown in figure 1.

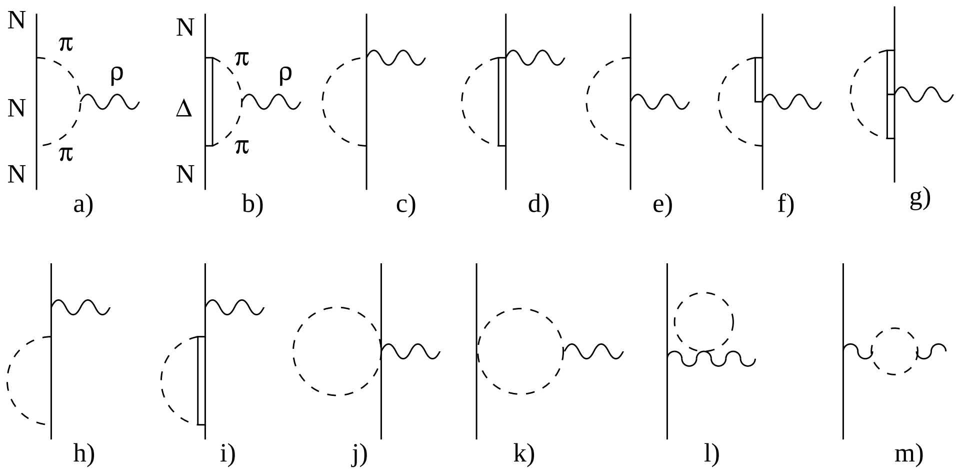

Figure 1: One loop diagrams evaluated.

References

[1] D. Jido, E. Oset and J. E. Palomar, arXiv:nucl-th/0202070.
[2] J. J. Sakurai, Annals Phys. **11** (1960) 1.