



Contribution ID: 85

Type: **Talk**

Chiral Perturbation Theory at finite volume or with twisted boundary conditions

Thursday, July 28, 2016 2:00 PM (20 minutes)

Recent progress in mesonic Chiral Perturbation Theory at finite volume and/or with twisted boundary conditions will be discussed. Topics include the finite volume at two-loop order calculations of masses and decay constants for the pseudoscalar of the normal case for two and three flavours [1], partially quenched three flavour [2] and the case for different patterns of spontaneous symmetry breaking [3].

Twisted boundary conditions lead to extra terms in Ward identities and form-factors which affects finite volume corrections and relations often used. This will be discussed for a number of cases, the older work [4] and the application to $K_{\ell 3}$ for staggered partially quenched [5]. Vector two-point functions relevant for the $g - 2$ HVP calculation will be treated at two-loop order [6] allowing a better estimate of twisting and finite volume corrections.

[1] Finite Volume at two-loops in Chiral Perturbation Theory, J. Bijnens and T. Rössler, [arXiv:1411.6384] JHEP 1501 (2015) 034

[2] Finite Volume for Three-Flavour Partially Quenched Chiral Perturbation Theory through NNLO in the Meson Sector, J. Bijnens and T. Rössler, [arXiv:1508.07238] JHEP 1511 (2015) 097

[3] Finite Volume and Partially Quenched QCD-like Effective Field Theories, J. Bijnens and T. Rössler, [arXiv:1509.04082] JHEP 1511 (2015) 017

[4] Masses, Decay Constants and Electromagnetic Form-factors with Twisted Boundary Conditions, J. Bijnens and J. Relefors, [arXiv:1402.1385] JHEP 05 (2014) 015

[5] C. Bernard, J. Bijnens, E. Gamiz and J. Relefors, work in progress

[6] J. Bijnens and J. Relefors, work in progress

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Session Classification: Weak Decays and Matrix Elements

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