Organisé conjointement par
CPHT-École Polytechnique et Groupe Théorie IPN Orsay

SÉMINAIRE de PHYSIQUE des PARTICULES

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Analytic solutions to massive two-loop sunset diagrams, and applications to Chiral Perturbation Theory

Résumé :
In this talk, we begin by showing how it is possible to obtain full analytic results for the two-loop three distinct mass scale sunset diagrams that appear in the expressions for the masses and decay constants of the pion, kaon and eta particles in two-loop SU(3) chiral perturbation theory. We then talk about two applications of these results: a) how it allows one to obtain small quark mass ratios to arbitrarily high powers, and b) how it allows one to make fits to lattice data to extract greater information about low energy constants. We then change track and discuss in more detail the Mellin-Barnes method used in our calculations, and demonstrate how this method can be extended using analytic continuation to obtain results for Feynman diagrams whose mass value parameters are such that it is impossible to use a direct calculation. We show how such methods of analytic continuation can also be helpful in contexts where a direct calculation does yield results, and thus set the stage for more widespread application of this technique.

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11:00

Salle A201