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The limits of the strong CP problem

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While CP violation has not been observed so far in processes mediated by the strong force, the QCD Lagrangian admits a CP-odd topological term proportional to the so-called theta angle, which weighs the contributions to the partition function from different topological sectors. The observational bounds are usually interpreted as demanding a severe tuning of theta against the phases of the quark masses, which constitutes the strong CP problem. In this talk, we challenge this view and argue that when taking the correct 4d infinite volume limit the theta angle drops out of correlation functions, so that it becomes unobservable and the CP symmetry is preserved. We arrive at this result by either using instanton computations or by relying on general arguments based on the cluster decomposition principle and the index theorem.

In-person participation

Yes

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