

Séminaire de physique des particules et de cosmologie

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When epsilon expansion goes semiclassical

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Even for weakly coupled theories processes with many quanta in general become non-perturbative. In the framework of the standard perturbation theory this fact is related to the factorial growth (with the number of external legs) of the number of Feynman diagrams contributing to the process. Thus, in order to study regimes with many quanta a different approach is needed. I'll present such an approach for $O(2)$ invariant $\lambda\phi^4$ theory at the Wilson-Fisher fixed point. Namely, using the operator-state correspondence, valid for conformal field theories, I'll show how anomalous dimensions of operators with arbitrary charge n can be computed as a power series in λ , by expanding around a non-trivial saddle. The result reproduces both $\lambda n \ll 1$ and $\lambda n \gg 1$ limits amenable to the usual perturbative analysis and the large charge expansion correspondingly.
