Universidad de Valladolid

Q-CAYLE COMUNICACIONES CUÁNTICAS

Inclusion of radiation in the Collective Coordinate Method approach of the ϕ^4 model

Sergio Navarro
Universidad de Valladolid

Abstract: Topological solitons are non-linear field theory solutions that exist in fundamental theories as well as in effective models. The analysis of their dynamics in the full theory is very involved and have to be solved numerically. This complexity comes from the multiple interaction channels. In this talk we will present an effective model including truly radiation modes as collective coordinates and study their role in certain dynamical processes. The different energy transfer mechanisms that arise between radiation and the discrete modes in the single-kink sector are carefully explained analytically. Our findings provide information on the effect of radiation in certain violent processes such as the kink-antikink annihilation. We also discussed the inclusion of radiation modes in the study of topologically non-trivial long-lived structures that deserve special attention, the oscillons.

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