Mean-field treatment of the linear sigma model in dynamical calculations of DCC observables *

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Approximate mean-field equations of motion for the classical chiral field are developed within the linear sigma model by means of a Hartree factorization. Both the approximate and the unapproximated equations of motion are augmented with a Rayleigh cooling term to emulate a uniform expansion, thereby allowing the extraction of observables relevant to the detection of disoriented chiral condensates. While the mean-field dynamics appears to be sufficiently accurate to be practically useful, the results also illustrate some of the difficulties associated with identifying the phenomenon experimentally.

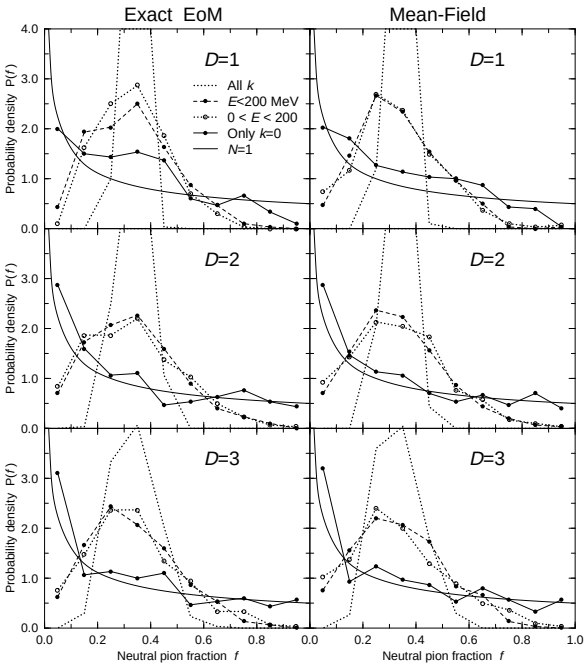

Figure 1: Distribution of the neutral fraction $= n_0/n$ after pseudo-expansion in D dimensions, using either the exact equation of motion (left) or the proposed mean-field approximation (right).

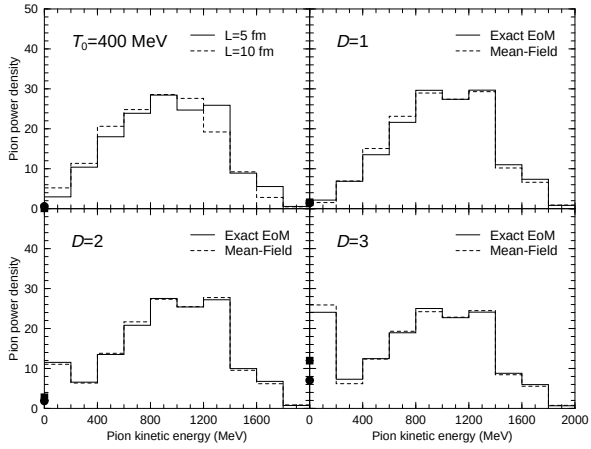

Figure 2: Pion power spectrum either in thermal equilibrium (upper-left) [1] or after a pseudo-expansion in D dimensions [2], with the exact equation of motion (solid) as well as the developed mean-field approximation (dashed).

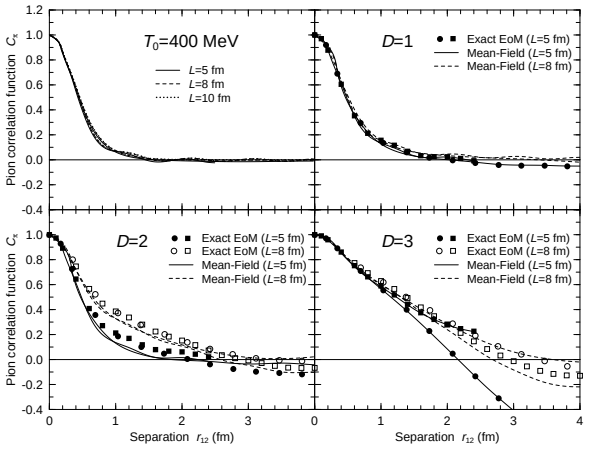

Figure 3: Pion correlation function for the same scenarios as in fig. 2.

[1] J. Randrup, Physical Review D (in press).

[2] J. Randrup, Physical Review Letters 77 (1996) 1226

* LBNL-39328 (1996): Nuclear Physics A (in press)