

On the applicability of the Wigner functional approach to the description of far-from-equilibrium quantum fields.

We consider toy ϕ^4 -like model of quantum evolution of matter created at the early stages of ultrarelativistic heavy ion collisions.

With the aid of the Keldysh technique we derive systematic semiclassical expansion of the quantum field dynamics.

The Leading Order term of this expansion supports the well-known recipe for calculation of an observable – averaging over initial conditions with weights given by Wigner function. However, applicability of the method can be tested only by calculation of the Next-to-Leading order corrections. We investigate the smallness of the Next-to-Leading order corrections for different parameters of the problem and reveal the range of applicability of the Wigner functional approach. We consider both cases of static and longitudinally expanding frameworks.

Collaboration

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