

Wigner Function: from Ensemble Average of Density Operator to Its One Matrix Element in Entangled Pure States

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Abstract: We show that the Wigner function $W = \text{Tr}(\Delta\rho)$ (an ensemble average of the density operator ρ , Δ is the Wigner operator) can be expressed as a matrix element of ρ in the entangled pure states. In doing so, converting from quantum master equations to time-evolution equation of the Wigner functions seems direct and concise. The entangled states are defined in the enlarged Fock space with a fictitious freedom.

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Key words: Wigner function, ensemble average of density operator, matrix element in entangled pure states

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