
”Wigner function representation in electron quantum optics.”

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Résumé

A time-frequency description of the electron coherence will be presented in analogy with the Wigner function representation in quantum mechanics. This approach reveals extremely useful in order to encode in a unique real function both the coherence properties in the time domain and the nature of the excitation generated by single or few electron sources.

When these sources are used as inputs of a Mach-Zehnder interferometer, the quantum interferences emerge in a clear way in this representation.

From the knowledge of the Wigner function and in particular of its marginal distribution one derives the evolution of the mean current as a function of time as well as the energy spectrum that are affected in a complementary way by the interference. The measurement of these quantities is within reach of nowadays experimental techniques.

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