

Revisiting the Callen-Welton theorem on quantum fluctuations dissipation theorem

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The quantum fluctuation dissipation theorem (QFDT) in the Callen Welton form has been critically revisited. We have shown that the role of the system eigenvalues is in general not correctly accounted for by the accepted form of the QFDT. As a consequence, a series of quantum results claimed in the literature, like the presence of zero point fluctuations, the violation of the quantum regression hypothesis, the non-white spectrum of the Langevin force, etc. emerge as a consequence of an incorrect application of the theorem. In this context the case of the single harmonic oscillator is illustrated as a typical example where the accepted form of the QFDT is proved to fail.

REFERENCES

1. L. Reggiani, P.Shiktorov, E. Starikov and V. Gruzinskis, Quantum fluctuation dissipation theorem revisited: remarks and contradiction, *Fluct. Noise Lett.* 11,1242002 (2012).