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Quantum measurements in finite space-time domain

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The talk is devoted to discussion of space-time domain finiteness effects for quantum Unruh-DeWitt detector which operates in this domain. We discuss a special renormalization procedure which happens to be different in finite and infinite domain cases. It is demonstrated that, as is typical for renormalization, a new dimensionful parameter appears, having the meaning of detector's recovery proper time. It plays no role in the leading order of perturbation theory but can be important non-perturbatively. We analyze the structure of finite time corrections to various observables. It is found that in large-time limit they can be described in a universal way, in a sense, and non-vanishing in adiabatic limit effects are of special interest. As an application, Landauer's principle interpretations for finite domain case are studied.

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