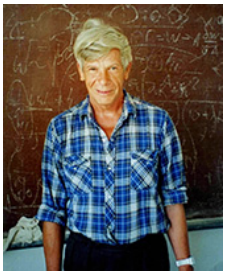

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Free energy and entropy in Rindler and de Sitter space-times

Friday, 14 October 2022 16:45 (25 minutes)

We investigate the free energy and entropy of the Gaussian massive scalar field theory in the static de Sitter space-time for arbitrary temperature.There are two types of contributions to the free energy: one is of the "area type" and can be attributed to the horizon, while the other is of the "volume type" and is associated with the interior of the space-time. The latter contribution in the odd-dimensional case in the limit of the week field (large mass or small Hubble constant) significantly depends on the temperature. Namely, for $\beta<2\pi$, the free energy behaves as $F_{bulk}\beta\sim e-\beta m$, while for $\beta>2\pi$ it behaves as $F_{bulk}\beta\sim e-2\pi m$. We also show that even the leading UV contributions to the free energy significantly depend on the state of the theory, which is very unusual. We explain the origin and physical meaning of these observations. As the model example we consider the situation in the Rindler wedge of the flat space-time.

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