SFB/TRR 21 - Colloquium

27. Januar 2017, Ulm

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Negative Entropies in the Casimir Effect

Imposing boundary conditions on the quantum vacuum can have interesting consequences. An example is the Casimir effect where fluctuations of the electromagnetic field lead to a force between metallic or dielectric objects. While the Casimir effect was already predicted almost seventy years ago, the experimental progress during the last two decades has stimulated extensive theoretical activities in recent years. Accounting not only for quantum fluctuations but also for thermal fluctuations of the electromagnetic field, thermodynamic aspects of the Casimir effect can be studied. Interestingly, it was found that the entropy can become negative under appropriate circumstances. In particular, the dissipative nature of the objects involved as well as their geometrical shape are of relevance. After a general introduction to the Casimir effect, we will explain the meaning of a negative Casimir entropy and its dissipative and geometric origins.

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