



TECHNISCHE UNIVERSITÄT
CHEMNITZ

Institut für Physik Physikalisches Kolloquium

- Online-Veranstaltung -



Mittwoch, 16.06.2021, um 11:15 Uhr

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From the critical Casimir effect to the Ising model on the rectangle

The thermodynamic Casimir effect describes an unusual interaction between particles embedded in a fluctuating medium. It is caused by the nontrivial dependency of the medium free energy F on the particles position and shape: $F \rightarrow F + \delta F$ changes under a particle displacement $r \rightarrow r + \delta r$, a Casimir force $F_C = -\Delta F / \Delta r$ on the particle emerges. This fluctuation-induced force is usually short-ranged, but it can become long-ranged near a critical point T_C , where the correlation $\xi(T \rightarrow T_C)$ of the medium fluctuations diverges. Therefore, this critical Casimir effect is a universal finite-size effect.

The critical Casimir effect has been investigated both theoretically and experimentally in various universality classes and geometries. The talk will give an overview over recent developments.

In the case of the exactly solvable square lattice Ising model, the Casimir potential and force can be calculated exactly for many geometries, including the finite rectangle with open boundary conditions, for which an exact solution could be found recently.

