

Ben-Gurion University of the Negev
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The Markovian Mpemba effect

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Abstract

Under certain conditions, it takes a shorter time to cool a hot system than to cool the same system initiated at a lower temperature. This phenomenon — the “Mpemba effect” — was first observed in water and has recently been reported in other systems. Whereas several detail-dependent explanations were suggested for some of these observations, no common underlying mechanism is known. We present two widely applicable mechanism for similar effects, the Markovian Mpemba effect, derive the sufficient conditions for their appearance, and demonstrate them explicitly in the anti-ferromagnet Ising model. Interestingly, the Markovian Mpemba effect can be classified as “weak” or “strong” and as “direct” or “inverse”. In the Ising model we show that the “strong” (direct and inverse) effect exists even in the thermodynamic limit.

Date & Location:

Tuesday, October 23, 2018, 11:00

Lecture room, Physics Building (ground floor)

