physikalisches Kolloquium

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Super-Planckian Radiative Heat Transfer

Mo. 4.11.24
16:00 Uhr
Ort: H34

Thermal radiation is one of the most universal physical phenomena, and its study has played a key role in the history of modern physics. Our understanding of this subject has been traditionally based on Planck's law, which sets limits on the amount of thermal radiation that can be emitted or exchanged. However, recent advances in the field of radiative heat transfer have defied these limits, and a plethora of novel thermal phenomena have been discovered that in turn hold the promise to have an impact in technologies that make use of thermal radiation [1,2].

In this talk, I will present an overview of our efforts devoted to exploring the limits of Planck's law and the implications of its violation [3-7]. Specifically, I will focus on our advances on the understanding of the so-called near-field radiative heat transfer, i.e., the heat exchange that takes place between objects separated by anometer-sized gaps, a situation in which the theoretical limits set by Planck's law can be overcome by orders of magnitude

References:

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[3] B. Song, Y. Ganjeh, S. Sadat, D. Thompson, A. Fiorino, V. Fernández-Hurtado, J. Feist, F.J. Garcia-Vidal, J.C. Cuevas, P. Reddy, E. Meyhofer, Nature Nanotechnol. 10, 253 (2015).

[4] K. Kim, B. Song, V. Fernández-Hurtado, W. Lee, W. Jeong, L. Cui, D. Thompson, J. Feist, M.T.H. Reid, F.J. García-Vidal, J.C. Cuevas, E. Meyhofer, P. Reddy, Nature 528, 387 (2015).

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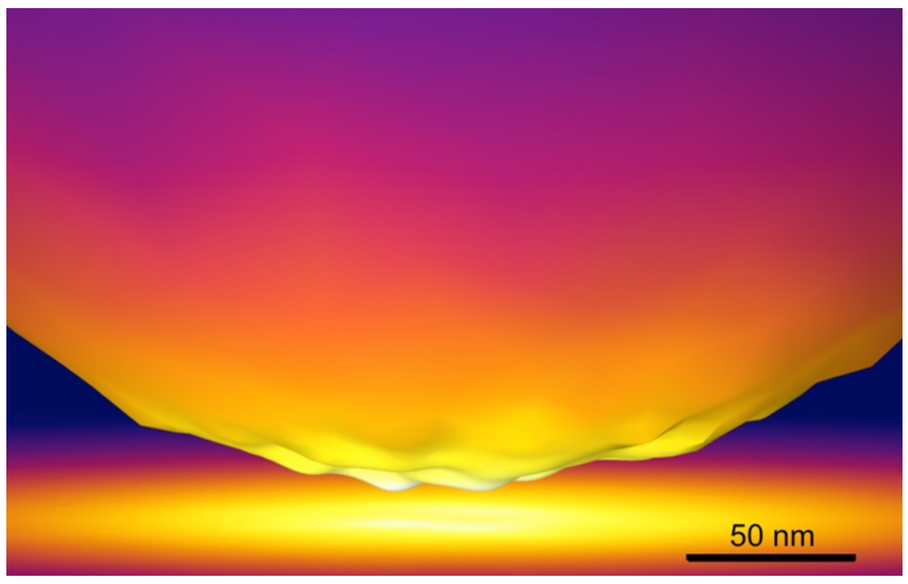
[6] V. Fernández-Hurtado, A.I. Fernández-Domínguez, J. Feist, F.J. García-Vidal, J.C.Cuevas, Phys. Rev. B 97, 045408 (2018).

[7] R. López-Nebreda, O. Mateos López, P.M. Martínez, J.J. García-Esteban, A. Babe, E.J.H. Lee, J.G. Vilhena, J.C. Cuevas, N. Agraït, under review.



Radiative heat transfer between a silica tip and a silica surface separated by 1 nm.

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