

# Colloquium Notice

## Slava Rotkin

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*How to pass all this heat through a needle's eye:  
The quantum theory of nano-carbon thermal  
interconnects*

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New solutions for thermal management have been sought recently due to increasing density of dissipated power in modern sub-50 nm electronic devices. Heat transport in nanostructures is affected both by bulk thermal resistances and by thermal coupling across the interfaces between dissimilar materials. The interface thermal resistance, also known as a Kapitza resistance, is in the focus of this talk. Highest intrinsic thermal conductivity of nano-carbons (such as graphene and nanotubes), closest to or even exceeding the diamond, is not helpful enough until one can efficiently connect the nano-carbon to the substrate. We will show that the near-field radiation, or quantum-electrodynamic Kapitza conductance mechanism is the main term in the heat exchange between the polar substrate and graphene or tubes. Such quantum terms may be anticipated to allow a breakthrough in the existing thermal technologies, and, at least, change our understanding of the heat transport at the nanoscale, still largely based on the classical thermal physics.  
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Monday

**March 5, 2012**

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326