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Near-field heat transfer between an array of SWNTs and a quartz substrate[1] ANDREI NEMILENTSAU, SLAVA ROTKIN, Department of Physics, Lehigh University — The near-field heat transfer between a quartz substrate and a sparse array of SWNTs oriented normal to the substrate was studied theoretically. The heat power transferred from the hot quartz substrate to the cold SWNTs was expressed through the electric field Green tensor of the system using the fluctuation-dissipation theorem . The integral equation for the Green tensor was obtained and solved numerically. The spectra of the transferred power were calculated and the pronounced resonance lines in the spectra were demonstrated at the frequencies of the polariton resonances in the quartz and antenna resonances of the surface plasmons in the SWNTs. The dependence of the transferred power on separation between the SWNTs and the substrate and on the SWNTs lengths in the array was also studied.

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