RADIATIVE HEAT TRANSFER BETWEEN A SMALL PARTICLE AND A SURFACE AT NANOMETRIC DISTANCES

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ABSTRACT. In this paper, we study the radiative heat transfer between a plane surface and a small particle held at nanometric distances. In the framework of fluctuational electrodynamics, we derive an expression of the energy exchange valid at micro- and nanoscales. Results of numerical simulations show that the main contribution to the radiative heat transfer comes from tunnelling waves. Our main result is that the transfer is enhanced by several orders of magnitude if the surface or the particle can support resonant surface waves. A possible application to local heating is discussed.