

THERMAL RADIATION OF NONISOTHERMAL PARTICLES IN COMBINED HEAT TRANSFER PROBLEMS

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ABSTRACT. Thermal radiation of large semi-transparent spherical particles is modeled on the basis of differential approximation suggested earlier by the author. This approach is employed to solve transient radiative-conductive problems for nonisothermal particles. Two applied problems for metal oxide particles are considered: the diagnostics of particle temperature in plasma spraying and solidification of core melt droplets during fuel-coolant interaction. It is shown that effect of particle semi-transparency in the near-infrared spectral range may be significant for both thermal radiation intensity and the physical picture of the particle solidification.