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【227】 Modelling of Radiative Heat Transfer for Plasma Arc Simulations

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The treatment of radiative heat transfer in arc simulation is difficult due to the large temperature inhomogeneity. Line-by-line integration of the radiative transfer equation is prohibitive due to the large computational effort needed. Therefore, the spectrum (e.g. 10^6 wavelengths) has to be reduced to a suitable number of bands (order 10). As the temperature variation is large, scaling assumptions used in standard methods from combustion may not be valid.

For arcs in Argon, we discuss possible approaches for an automatic generation of bands using clustering algorithms from machine learning. The number of bands for an accurate description of heat transfer is verified for a typical arc profile. Different algorithms and their performance are compared.

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