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On the effect of fractal geometric parameters on the heat transfer features of circular impinging jets TOMMASO ASTARITA, GIUSY CASTRILLO, GIOACCHINO CAFIERO, Universit degli Studi di Napoli Federico II — Several solutions have been proposed over the last decades to increase the heat transfer rate of impinging jets. In all cases the heat transfer enhancement is obtained by exciting/altering the structure and organization of large scale turbulence, which is widely recognized to be the main agent in heat and mass transfer mechanism of impinging jets. Tampering with the large coherent turbulent structures is the key to achieve a significant heat transfer enhancement. In a recent work we demonstrated the effectiveness of fractal turbulence in this sense. Its effect is such that the heat transfer rate increases up to 63% in the stagnation region with respect to the well-known circular jet under the same power input. However, a systematic analysis of the effect of the singular geometric parameters of the fractal grid (such thickness ratio and length ratio) onto the spatial distribution of the Nusselt number has not been proposed yet. In this work we propose the analysis of the heat transfer enhancement produced by a class of turbulence promoters located in correspondence of the nozzle exit section of a circular jet. The upward shift of the turbulence intensity profile due to the blockage effect induced by the growing shear layer is discussed in terms of heat transfer enhancement.

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