Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

On the effect of fractal generated turbulence on the heat transfer of circular impinging jets TOMMASO ASTARITA, GIOACCHINO CAFIERO, STEFANO DISCETTI, Università degli Studi di Napoli Federico II — The intense local heat transfer achieved by circular impinging jets is exploited in countless industrial applications (cooling of turbine blades, paper drying, tempering of glass and metals, etc). The heat transfer rate depends mainly on the Reynolds number, the nozzle-to-plate distance and the upstream turbulence. It is possible to enhance the heat transfer by exciting/altering the large scale structures embedded within the jet. In this work turbulent energy is injected by using a fractal grid at the nozzle exit. Fractal grids can generate more intense turbulence with respect to regular grids with the same blockage ratio by enhancing the jet turbulence over different scales. Consequently, they are expected to improve the convective heat transfer. The results outline that a significant improvement is achieved (for small nozzle-to-plate distances up to 100% at the stagnation point and more than 10% on the integral heat transfer over a circular area of 3 nozzle diameters) under the same power input.

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Date submitted: 17 Jul 2013 Electronic form version 1.4