

Abstract Submitted
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Wake characteristics of a porous square cylinder formed by a multi-scale array of obstacles DANIEL J. WISE, Univ of Sheffield, PAULINE AVOUSTIN, MARTIN CASSADOUR, INP ENSEEIHT, WERNHER BREVIS, Univ of Sheffield — The characteristics of the flow developed behind arrays of square cylinders are investigated through Particle Image Velocimetry (PIV) and Acoustic Doppler Velocimetry (ADV) measurements in an open-channel water flume. Four arrangements of cylinders are examined: three are multi-scale arrays of cylinders based on the Sierpinski carpet fractal, and the fourth is a regular aligned array of single length-scale cylinders. The porosity, frontal area and external length scale is the same for each cylinder array, while the internal geometry is changed. The relative effect on the dynamics of the wake of the fractal parameters defining the array geometry, such as lacunarity and succolarity is quantified. Special focus is given to the effect of these parameters on the extension and properties of the separated shear layers and on the low-velocity zone developed downstream the cylinders.

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