Abstract Submitted
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On the unsteady dynamics of fully submerged, rigid and flexible canopies LIU HONG, University of Illinois, ROBERT C HOUSEAGO, DANIEL PARSONS, University of Hull, JAMES L BEST, University of Illinois, LAI WING, TSI Incorporated, Fluid Mechanics Research Instrument, LEONARDO P CHAMORRO, University of Illinois — The unsteady dynamics of a fully submerged exible canopy, and the near-field turbulence were explored experimentally under various ow conditions. The flow surrounding the flexible canopy was compared with that from a similar case with a rigid canopy. The flexible and rigid canopies consisted of thin prismatic elements of large-aspect ratio, which were placed in a staggered pattern in a developed boundary layer. Planar and volumetric particle image velocimetry (PIV) and particle tracking velocimetry (PTV) were used to characterize the turbulence and the motions of the elements within the center of the canopy along the span of the array. Results show that the flow and structures reached equilibrium state at different downstream locations. Structure dynamics resulted reconfigured the turbulent exchange between the inner and outer flows within a range of scales. Analysis of the tip motions of the canopy elements allowed exploring the local flow dynamics across the canopy.

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