

Abstract Submitted
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Time resolved measurements of rigid fiber dispersion in near homogeneous isotropic turbulence LILACH SABBAN, ASAF COHEN, RENE VAN HOUT, Technion - Israel Institute of Technology, EMPFL ENVIRONMENTAL MULTI-PHASE FLOW LABORATORY TEAM — Time resolved, planar particle image velocimetry (PIV, 3kHz) and two-orthogonal view, digital holographic cinematography (2kHz) was used to measure 3D fiber trajectories/orientation dynamics in near homogeneous isotropic air turbulence (HIT) with dilute suspended fibers. The PIV covered a field of view of $6 \times 12 \text{ mm}^2$ and the holography a volume of interest of 17^3 mm^3 , positioned at the center of the chamber. HIT ($Re_\lambda = 144$) was generated in the center of a 40^3 cm^3 cube by eight woofers mounted on each of its corners. Three different nylon fibers having a length of 0.5 mm and diameter of 10, 14 and $19 \mu\text{m}$ were released from the top of the chamber. Fibers had Stokes numbers of order one and are expected to accumulate in regions of low vorticity and settle along a path of local minimal drag. Fiber 3D trajectories/orientations have been obtained from the holography measurements and orientational/translational dispersion coefficients will be presented. In addition the flow field in the vicinity of tracked fibers has been resolved by the PIV, and results on fluid and fiber accelerations and position correlation with in-plane strain rate and out-of-plane vorticity will be presented.

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