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Time resolved measurements of particle lift off from the wall in a turbulent water channel flow RENE VAN HOUT, Technion-Israel Institute of Technology, BORIS RABENCOV, JAVIER ARCA, Technion - Institute of Technology — Time-Resolved Particle Image Velocimetry (TR-PIV) and digital holography measurements were carried out in a dilute particle-laden flow tracking both Polystyrene Spheres (PS, $\sim$0.583 mm, d^+ $\sim$10) as well as resolving the instantaneous velocity field of the turbulent flow. Measurements were performed in a closed loop, transparent, square channel facility (50x50 mm^2) at 127.5cm from the inlet with bulk water velocity 0.3 m/s (Re_h = 7353) and friction velocity 0.0174 m/s. Data were captured at 1 kHz, corresponding to a time scale 5x smaller than the flow's viscous scale. Single view digital holographic cinematography was used to track the 3D PS motion inside the VOI (17x17x50 mm^3) including the wall bottom. TR-PIV in a vertical plane (29.3x29.3 mm^2) oriented along the channel's centerline imaged PS together with flow tracers. Discrimination was based on their size difference. Instantaneous sequences of PS plotted on the spatial velocity, vorticity and swirling strength maps showed the effect of turbulent flow structures and resulting particle movement. Results are presented for particles that lift off from the bottom wall as a result of complex interaction with ejection and sweep motions.

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