

Abstract Submitted
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Particle and fluid velocity measurement technique in suspended sediment sheet flow CHANG LIU, KENNETH KIGER, University of Maryland, College Park — Particle-turbulence interaction within the suspension layer of oscillatory sheet flow is complicated and remains an open question in the literature. Existing experimental measurements in this region usually lack the resolution required to resolve the coupled behavior between the fluid and sediment phase, due to the strong light scattering that occurs from the mobile bed and the large difference in size between the sediment and fluid tracer particles. A multi-camera imaging method in combination with fluorescent tracer particles has been developed using an apertured spectral filter to provide a balanced image of both the tracer and sediment particles. This enables whole field, temporally-resolved particle-scale concurrent measurement of both phases within the suspended region, up to sediment volumetric fractions of close to 0.01. The proposed technique is validated with composite/synthetic two-phase flow. The dispersed phase motion is generated by translating, with prescribed motion, a gel box that contains layers of sediment particles with known concentrations, mimicking the sediment distribution and motion encountered in an actual sheet flow. The uncertainties in the measured kinematics of both phases are quantified.

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