

Abstract Submitted
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Measurements of the cross-sectional distributions of spherical particles suspended in rectangular channel flows TAKAHIRO IMANISHI, TAKUYA YABU, HIROSHI YAMASHITA, TOMOAKI ITANO, MASAKO SUGIHARA-SEKI, Kansai Univ — We investigated the inertial migration of neutrally buoyant spherical particles using millimeter-sized rectangular channels of various aspect ratios ($AR = 1 - 4.2$), in the range of Reynolds numbers (Re) from 100 to 2000. The Reynolds number was defined as UH/ν , where U is the maximum flow velocity, H is the length of the shorter face of the channel cross-section, and ν is the kinematic viscosity. Dilute suspensions of polystyrene particles of diameter $d = 300 - 650 \mu\text{m}$ were used. For the size ratio $d/H = 0.1 - 0.25$, the observation of particle positions at downstream cross-sections revealed that the particles were aligned in a straight or curved line nearly parallel to the longer face of the channel cross-section and their probability density function showed a sharp peak at a certain distance from the channel centerline. These focusing positions of particles were found to depend on Re , d/H and AR . They approached the channel centerline with increasing Re . As AR increased for constant Re and constant d/H , focusing positions moved closer to the channel centerline, and reached asymptotic positions for $AR > 2$.

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