Abstract Submitted
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Colloid-Colloid Hydrodynamic Interaction Around a Bend in a Quasi-One-Dimensional Channel[1] CHRISTOPHER LIEPOLD, University of Chicago, RYAN ZARCONE, University of California, Berkeley, TIBOR HEUMANN, BINHUA LIN, STUART RICE, University of Chicago — We report a study of the correlation between a pair of particles in a colloid suspension in a bent quasi-one-dimensional (q1d) channel as a function of bend angle. As the bend angle becomes more acute, we observe an increasing depletion of particles in the vicinity of the bend and an increase in the nearest-neighbor separation in the pair correlation function for particles on opposite sides of the bend. Further, we observe that the peak value of D_{12}, the coupling term in the pair diffusion tensor that characterizes the effect of the motion of particle 1 on particle 2, coincides with the first peak in the pair correlation function, and that the pair separation dependence of D_{12} mimics that of the pair correlation function. We show that the observed behavior is a consequence of the geometric constraints imposed by the single-file requirement that the particle centers lie on the centerline of the channel and the requirement that the hydrodynamic flow must follow the channel around the bend. We find that the correlation between a pair of particles in a colloidal suspension in a bent q1D channel has the same functional dependence on the pair correlation function as in a straight q1D channel when measured in a coordinate system that follows the centerline of the bent channel.

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