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Sunday–Tuesday, November 21–23, 2021; Phoenix Convention Center, Phoenix, Arizona

[Session P15: General Fluid Dynamics](#)

4:05 PM–6:41 PM, Monday, November 22, 2021

Room: North 129 A

Chair: Hunter King, University of Akron

Abstract: P15.00003: Attraction and Repulsion of a Pair of Sedimenting Ball-Chains at Low Reynolds Number*

4:31 PM–4:44 PM

Authors:

Shashank J Honnenahalli, Yevgen Melikhov, Maria L Ekiel-Jezewska

Abstract:

We explore the hydrodynamic interaction of a pair of sedimenting ball-chains at low Reynolds number. We focus on experiments and compare the results with theory and simulations. The ball-chains are a proxy to elastic filaments, with their bending capability being dependent on the number of beads present. The study is focused on the tendency of the ball-chains to attract or repel each other for certain classes of initial positions (in particular, 1. horizontal and parallel to each other and 2. one above the other at perpendicular orientations) as well as the effect of increasing the number of beads on the ball-chain particles. In experiments, the millimeter sized ball-chains sediment in a large glass tank filled with highly viscous silicon oil. We obtain two perpendicular views of the particles using two cameras, which enables us to track the motion of the particles. From the photographs, we quantify the relative dynamics and shape deformation of the particles. We compare these experimental results with the results from numerical simulations based on the multipole expansion of the Stokes equations, as implemented in the Hydromultipole numerical codes.

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