

71st Annual Meeting of the APS Division of Fluid Dynamics
Sunday–Tuesday, November 18–20, 2018; Atlanta, Georgia

Session A24: Microscale Flows: Streaming and Assembly.

8:00 AM–9:57 AM, Sunday, November 18, 2018
Georgia World Congress Center Room: B312

Chair: Anke Lindner, ESPCI Paris

Abstract: A24.00006 : Effect of bending on sedimentation of two deformable microparticles*

9:05 AM–9:18 AM

← Abstract →

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Due to fast development of manipulation and observation techniques in microfluids, the dynamics of deformable microparticles under gravity, or centrifuged, is becoming an interesting topic of research. One of basic problems is how two such objects interact hydrodynamically with each other, and are there any ordering effects. In our previous study we reported that two sedimenting microfilaments in a symmetric configuration initially oscillate and later converge to an aligned, horizontal configuration.

Here we show that for this system, bending of microparticles is the crucial feature behind their alignment behavior. We show that two sedimenting elastic trumbbells, the simplest model of bending particles, are able to recover dynamics of elastic filaments. A model of elastic particles which cannot bend, two dumbbells, leads to very different dynamics: particles oscillate, repel each other and do not align. We propose mechanism responsible for observed alignment effect of two flexible particles. Additionally, stability of the alignment is examined and confirmed. We conclude that trumbbell model may accurately describe important features of moving microfilaments and other microparticles which can bend.

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