Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

High throughput separation of live microalgae ENDRE JOACHIM MOSSIGE, ATLE JENSEN, Department of Mathematics, University of Oslo, Oslo, Norway — A high throughput microfluidic device is used to separate live algal cells of distinctively different shape and size. We demonstrate separation and concentration of four different cell types, shaped like rods, spheres or disks. Our results are compared to results obtained using rigid spheres. We identify different separation modes by streakline visualizations that depend on the size and shape of spheres and algal cells. By tuning the flow field, the concentration ratio is maximized for each type of particle. Our results show that the majority of cells separate with higher concentration ratios than rigid spheres of similar size. We present a second order relation between size and concentration ratio for test spheres and demonstrate excellent agreement with the data points (R^2=0.9997). Velocity measurements by μPIV and PTV show that fluid and particle inertia is necessary for separation.

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Date submitted: 29 Jun 2017 Electronic form version 1.4