**LFPB Seminar**

**MAX PLANCK INSTITUTE**
FOR DYNAMICS AND
SELF-ORGANIZATION

# Persistence of vortex formation in dense suspensions and shear-thinning fluids across transitional and turbulent regimes


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We study transport and entrainment for vortex rings within a range of dense suspensions and across transitional and turbulent regimes. In order to peer into these opaque flows we apply an ultrasound-based Lagrangian particle tracking (echo-LPT) technique. By tracking fluid parcels in and around the evolving vortex ring we are able to quantify the particle residence time (PRT), and observe that PRT in suspensions is highest when compared to the baseline, pure-water case. This observation coincides with decreasing entrainment for increasing concentrations of suspension. However, the convective entrainment mechanism during vortex-ring formation is found to be consistent for all fluids. In the second part of this seminar, we examine vortex formation and evolution in an analogous and seemingly 'simpler' shear-thinning fluid but at higher Reynolds numbers. We apply a more traditional time-resolved particle image velocimetry (PIV) technique to extract characteristic features in these pulsatile flows. Here we find small-scale vortex shedding, bursting, and coalescence. As shear-thinning strength increases, signatures of structure coalescence increase and small perturbations are dampened.


## Thursday, February 15th, 2023 at 14:30
## MPI-DS, Seminar room 0.79
## and Zoom


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