

## **287i Approaches to Non-Brownian Particle Migration in a Stirred Tank Flow**

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Rotating viscous flows have been shown to contain regions of chaos and regions of regularity, which can serve as attractors for non-Brownian particles. This study details experimental observations of non-neutrally buoyant spherical particles spontaneously migrating (across fluid streamlines) to such regular locations within the toroidal flow between parallel flat disks in a stirred tank flow. These experimental results are also compared to two different versions of continuum-based Lagrangian advection model, based on the Basset-Boussinesq-Oseen (BBO) equation.

The first model is an approximate 2D analytical solution which shows an inward migration within the cell flow structure for particles both heavier and lighter than the continuous phase. The second model is a discrete version of the BBO equation which includes a numerical analysis of the experimental flow field. We show that the character of the flow in these toroids, located above and below each impeller in a simple mixing tank, has a dramatic effect on the ultimate equilibrium location of the particles. Depending on flow/particle conditions the asymptotic migration position varies between multi-period islands as well as the center of the toroid.