CENTER FOR FLUID MECHANICS
AND
THE FLUIDS, THERMAL AND CHEMICAL PROCESSES GROUP
OF
THE DIVISION OF ENGINEERING
SEMINAR SERIES

Eric Climent
Laboratoire de Génie Chimique
Toulouse, France

Dynamics of Solid/Liquid Suspensions Under Shear Flow

Dynamics of solid/liquid suspensions under shear flow The dynamics of macroscopically homogenous sheared suspensions of neutrally buoyant, non-Brownian spheres is investigated in the limit of very small Reynolds and Stokes numbers using the Force Coupling Method.

Multi-body interactions are achieved by direct solution of Stokes flow equations coupled with the lagrangian tracking of particles in a fully periodic cubic domain. Statistical quantities (translation and rotation velocity fluctuation tensors, particle self-diffusion) were compared to the reference work of Drazer et. al.

The self-diffusion tensor was found to be anisotropic. Our results compared favourably with former numerical and experimental studies. The diffusion scales with the square of the volumetric concentration and is both related to velocity fluctuation enhancement and diffusion time increase. The pair probability density function computed while the particles move under shear flow has been compared with a purely random suspension. The maximum value is strongly enhanced by hydrodynamic interactions Similar analysis is carried out on bidisperse suspensions for various concentrations of both species.

TUESDAY – May 2, 2006
Barus & Holley, Room 190
3:00pm