

SPECIAL PHYSICAL MATHEMATICS SEMINAR

HYDRODYNAMIC INTERACTIONS IN COLLOIDAL PHYSICS AND BIOLOGY

HOLGER STARK

Max-Planck Institute for Dynamics and Self-Organization
Goettingen, Germany

ABSTRACT:

The talk reports on recent work on hydrodynamic interactions (HI), a typical feature of colloidal systems. It presents examples from colloidal physics, which illustrate the special properties of HI, and then applies HI to problems connected with locomotion in biology at low Reynolds numbers.

In particular, the talk reports on a combined experimental and theoretical work on the collective behavior of colloidal particles moving in a toroidal trap that is realized by a fastly spinning optical tweezer. Then a superparamagnetic elastic filament is introduced that can mimic flagella or cilia. They are used by micro organisms to move forward and also for fluid transport. At last, it is shown how HI synchronize rotating helices and thereby contribute to the bundling of helical flagella that bacteria employ for their locomotion.

THURSDAY, MARCH 9, 2006

4:00PM

Building 4, Room 231



Massachusetts Institute of Technology
Department of Mathematics
Cambridge, MA 02139