



Jülich Soft Matter Days

11 - 14 November 2014

Seminaris Hotel in Bad Honnef, Germany

Book of Abstracts



Jülich Soft Matter Days 2014

11 - 14 November 2014

Seminaris Hotel in Bad Honnef, Germany



Local Organizers:

Forschungszentrum Jülich
- in der Helmholtz-Gesellschaft -

Institute of Complex Systems

Prof. Dr. J.K.G. Dhont
Soft Condensed Matter (ICS-3)

Prof. Dr. G. Gompper
Theoretical Soft Matter and
Biophysics (ICS-2/IAS-2)

Prof. Dr. D. Richter
Neutron Scattering (ICS-1/JCNS-1)

Book of Abstracts

Supported by: Forschungszentrum Jülich
and European Network of
Excellence "SoftComp"

Dynamics of elastic dumbbells sedimenting in a viscous fluid: oscillations and hydrodynamic repulsion

M. Bukowicki, M. Gruca, M. Ekiel-Jeżewska

*Institute of Fundamental Technological Research, Polish Academy of Science,
Warsaw, Poland*

E-mail: mbuk@ippt.pan.pl

Periodic motion of several particles falling under gravity in a viscous fluid was theoretically and experimentally observed in a range of systems, including some four-particle configurations or a pair of rigid rods. In addition to its fundamental significance, such a motion is considered as important to understand general features of sedimenting random swarms, and suspensions.

In this work, we consider a symmetric system of two elastic fibers, modeled as elastic dumbbells, sedimenting in a vertical plane. We focus on the problem how the elasticity (which breaks time-reversal symmetry of the motion) affects the system's dynamics. The point-particle model is used.

We observe oscillating, but non-periodic motion of the elastic particles. Independently of the value of the spring constant, the hydrodynamic repulsion appears between the dumbbells. The trajectory shift is slower when k tends to 0 or to ∞ - in these limiting cases we recover the periodic dynamics reported in the literature. For a given finite but non-zero spring constant we observe existence of a universal time-dependent trajectory to which the system converges.