



## Editorial

Welcome to the third issue of the annual SFB TR6 Gemeindebrief. This newsletter is a forum to present the recent research highlights and scientific activities of the collaborative research centre SFB TR6. It is directed both to researchers in the network and to other scientists interested in the physics of colloidal dispersions. The newsletter also includes a short personalia section and information about SFB TR6 and soft matter conferences, schools and workshops.

Those who want to know more about the SFB TR6 are invited to visit our web page: [www.sfb-tr6.de](http://www.sfb-tr6.de)

Hartmut Löwen  
Sybille Böhm, Brigitte Schumann

## CODEF II 2008

### International Conference, Bonn, Germany

The International CODEF II conference Colloidal Dispersions in External Fields was held in Bonn - Bad Godesberg from 31 March to 2 April 2008.

This central SFB conference continued the CODEF I meeting from 2004 and covered the whole topic of the SFB TR6. There were 194 registered participants from 19 countries.

The number of participants has grown significantly compared to the CODEF I meeting showing that colloids in external fields are an emerging strongly growing research field. 15 international leading scientists were invited to present talks and every project of the SFB TR6 was represented by a talk (including the young researcher group of Dr. Martin Oettel).

Moreover 120 posters were presented. The conference included also a boat excursion on the Rhine river.

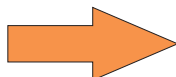


## New SFB Secretary

Since the 15.01.2008 Sybille Böhm is the new secretary of the SFB TR6. She and the student assistant Brigitte Schumann are the successors of the long-term secretary of the SFB TR6 Heike Kaminski in the Heinrich-Heine University Düsseldorf.



Heike Kaminski



B. Schumann S. Böhm

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## Pictures of the CODEF II

coffee break



poster session



free time



talks



boat trip

## Workshop Grenoble

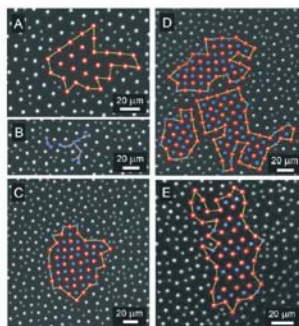
The young researchers SFB TR 6 meeting was organized in fall 2007 by A. Erbe (Konstanz). It was found very profitable to bundle it with a regular meeting of the International Research Training Group Soft Condensed Matter which is based at Konstanz University and is lead by G. Maret.

This German-French Research Training Group involves also the Universite Joseph Fourier in Grenoble and the Universite Louis Pasteur in Strasbourg. The joint meeting was placed in Grenoble in September 2007 (17.-21.9.2007) and nicely documents the scientific overlap between the SFB TR6 and the German-French Research Training Group.



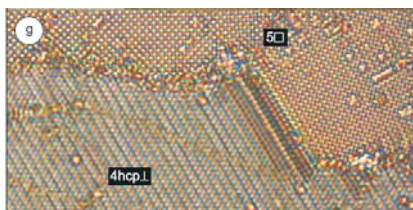
**Selected scientific results****Two-dimensional crystalline structure of binary magnetic colloids**

Binary mixtures of two-dimensional dipoles with dipole moments perpendicular to the plane are realized by superparamagnetic suspensions in a magnetic field. The zero-temperature phase diagram was calculated for arbitrary ratio of the two dipole moments and a wealth of different crystal phases was found (L. Assoud, R. Messina, H. Löwen, *EPL* **80**, 48001 (2007); J. Fornleitner, F. Lo Verso, G. Kahl and C.N. Likos, *Soft Matter* **4**, 480 (2008). For strong asymmetric mixtures the theoretical predictions were confirmed experimentally by studying the local order in a polycrystalline sample (F. Ebert, P. Keim and G. Maret, *Eur. Phys. J. E* **26**, 161 (2008)). This is a collaboration between the projects C2, C3 and D1.

**Construction and stability of a close-packed structure observed in thin colloidal crystals**

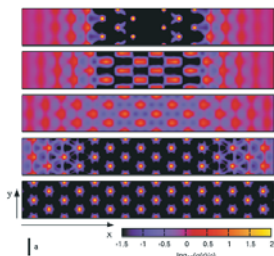
A. Barreira Fontecha, T. Palberg, and H.J. Schöpe, *Phys. Rev. E* **76**, R050402 (2007)

A new phase for confined colloidal crystals derived from a stacked hexagonal-closed-packed layered phase was discussed and constructed (project D1).

**Colloidal crystal growth at externally imposed nucleation clusters**

S. van Teeffelen, C. N. Likos and H. Löwen, *Phys. Rev. Lett.* **100**, 108302 (2008)

Using a dynamical density functional theory and computer simulations, the conditions under which an externally imposed cluster serves as a seed for further heterogeneous crystal nucleation was examined.

**Entrapment of charged, nonwetting colloids near oil-water interfaces**

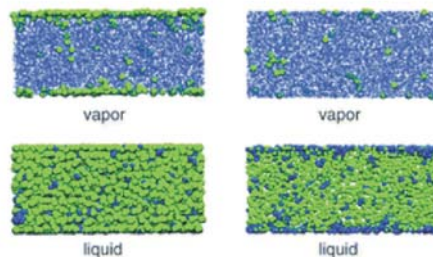
M. Oettel, *Phys. Rev. E* **76**, 041403 (2007)

Charged, nonwetting colloids near oil-water interface are examined by theory. It is shown that an effective dipole describes the leading part of their effective interaction. This is one of the results obtained within the independent junior researcher group of the SFB TR6.

**Confinement effects on phase behaviour of soft matter systems**

K. Binder, J. Horbach, R. L. C. Vink, A. de Virgiliis, *Soft Matter* **4**, 1555 (2008)

A colloid-polymer mixture confined between two walls is studied close to fluid-fluid phase separation when a wall prefers one phase. The corresponding interface is getting stabilized between the walls and can exhibit transitions where it gets localized at one of the walls (project A5).

**Rayleigh-Taylor instability in the sedimentation of confined colloids**

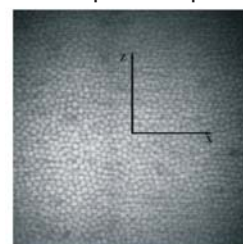
A. Wysocki, C. P. Royall, R. Winkler, G. Gompper, H. Tanaka, A. van Blaaderen, H. Löwen

In a large collaboration between Jülich (simulation, project A4), Düsseldorf (theory, project D3) and Utrecht (experiment, project A3), the initial and nonlinear stages of an inverted confined colloidal suspension was observed during gravitational settling, in further collaboration with H. Tanaka (Tokyo) and P. Royall (Bristol).

**From Equilibrium to Steady State: The Transient Dynamics of Colloidal Liquids under Shear**

J. Zausch, J. Horbach, M. Laurati, S. Egelhaaf, J. M. Brader, T. Voigtmann, and M. Fuchs, *J. Phys.: Condens. Matter*, accepted for publication; J.M. Brader, M.E. Cates and M. Fuchs, *Phys. Rev. Lett.* (in press)

Using a combination of mode coupling theory (Konstanz), computer simulation (Mainz) and real-space experiment (Düsseldorf) a superdiffusive motion is identified in the transient dynamics during the start-up of shear in a colloidal suspension. This is a collaboration of projects A6 and A5.

**Residence and waiting times of Brownian interface fluctuations**

V. W. A. de Villeneuve, J. M. J. van Leuwen, J. W. J. de Folter, D. G. A. L. Aarts, W. van Saarloos, H. N. W. Lekkerkerker, *EPL*, **81** 60004 (2008)

Interface fluctuations in a phase-separated colloid-polymer mixture were studied with laser scanning confocal microscopy. The residence times of capillary waves above a given height and the typical waiting time in between such fluctuations were measured and agreement with theory was found.



**Editorial Details**

**Editors:**

Hartmut Löwen, Sybille Böhm,  
Brigitte Schumann  
SFB TR6 HHU Düsseldorf  
Universitätsstr. 1, 40225 Düsseldorf

**Contact:**

Tel.: +49 211 81 12746  
Fax: + 49 211 81 12262  
transregio@thphy.uni-duesseldorf.de  
www.sfb-tr6.de

**Crystallization and Jamming of colloids in Leiden (NL)**

The workshop "Crystallization and Jamming in Soft Matter under Driving" was organized at the Lorentzcenter in Leiden (11-22 February 2008) by M. Sperl (Cologne), S. Luding (Twente) and H. Löwen (Düsseldorf). This workshop brought together the

communities of colloidal suspensions, granular media, foams and complex plasmas. Invited speakers from the SFB TR6: A. van Blaaderen (Utrecht), M. Dijkstra (Utrecht), M. Fuchs (Konstanz), G. Maret (Konstanz). The workshop was supported financially by the SFB TR6.

**upcoming**

Conference/Place	Date
<b>16th Ostwald-Colloquium:</b> Colloidal systems in external fields Leipzig, Germany	<b>22.9. - 24.9.2008</b>
<b>Jülich Soft Matter Days 2008</b> Bonn, Germany	<b>11.11. - 14.11.2008</b>
<b>At the forefront of Soft Condensed Matter</b> Les Houches, France	<b>15.2. - 20.2.2009</b>

**Special among the SFB TR6 guests:**

10/2007	<b>H. Tanaka</b> , (Tokyo) visits Düsseldorf.
10-12/2007	<b>B. Cichocki</b> , (Warsaw) visits Jülich.
5/2008	<b>I. Snook</b> , (Melbourne) visits Mainz.
8/2008	<b>J. Thijssen</b> , (Edinburgh) visits Utrecht.

**„SFB TR6 meets SFB TR24“**



The SFB TR6 has formally agreed on a cooperation with the SFB TR24 "Fundamentals of Complex Plasmas" by an exchange of ideas, concepts and by providing mutual joint measures to promote young scientists. The physics of highly charged dust particles in plasma traps which is one major focus of the project group A in the SFB TR24 bears clear similarities with charged colloidal suspensions which can be exposed to external fields which is studied in the SFB TR6, in particular in the project groups B and D. A mutual cross-fertilization in comparing problems, methods and set-ups will be of great benefit for both SFB's.

**72. Annual meeting of the German Physical Society (Solid State Physics)**

**Berlin, February 25th - 29th, 2008 Driven Soft Matter: "Non-Equilibrium Phenomena in External Fields"**  
*organised by Silke Rathgeber, Tanja Schilling, and Matthias Fuchs*

The symposium focused on non-equilibrium phenomena of complex soft matter in response to external fields bridging results obtained from experiment, computer simulation and theory. It consisted of nine invited talks (including two from members of the SFB TR6), and more than seventy contributions linking information obtained on microscopic length scales to the macroscopic behavior of these systems. Many internationally leading scientists took part in the symposium, which lead to fruitful scientific discussions.

**prizes and honors**

**H.N.W. Lekkerkerker** (Utrecht) has been awarded the Liquid Matter Prize of the European Physical Society during the 7th Liquid Matter Conference in Lund, Sweden.

**P. Virnau** (Mainz) was honored with the Walter-Kalkhof-Rose-Gedächtnispreis of the Academy of Science and Literature, Mainz.

**J. Elgeti** (Jülich) was awarded the Günther-Leibfried-Preis 2007.

**C. N. Likos** (Düsseldorf) has been elected in the Advisory Board of the Journal "Soft Matter".

**D. Richter** (Jülich) was appointed member of the NanoGUNE Advisory Board (Nanoscience initiative of the Basque country).

**S.U. Egelhaaf** (Düsseldorf) was appointed member of the ESSS (European Spallation Source-Scandinavia) Science Advisory Committee.

**"Jugend forscht 2008" in physics**

The SFB TR6 was in contact with the young researcher **David Wittkowski** who is the recent Bundessieger in physics in the *Jugend forscht* program. In particular, a shear cell was designed by him in order to study the polygonal structures in rotating simple and complex liquids and therefore an exchange of ideas with the research of the SFB was helpful. David Wittkowski was also supported by sharing equipment from the SFB TR6.



(H.N.W. Lekkerkerker)



(P. Virnau)



(J. Elgeti)

