
IOP**Institute of Physics****Liquids and Complex****Fluids Group**

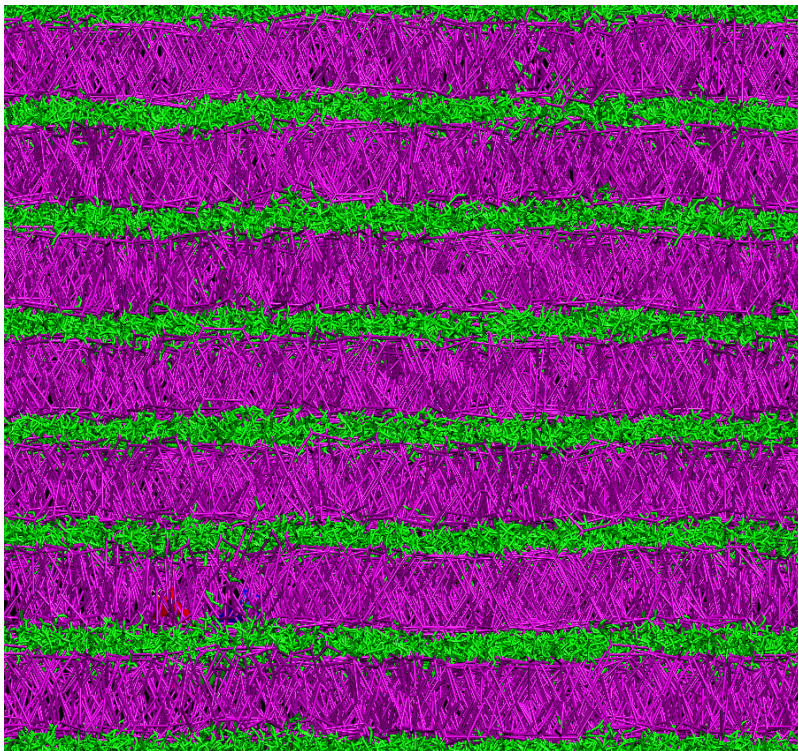
NEWSLETTER**Sept 2011****Issue no. 6**

Image of a smectic liquid crystal formed by shape persistent macrocycles (Image Carlos Avendaño and Erich A. Müller, Imperial College London).

See <http://www.iop.org/activity/groups/subject/lcf/> for further details

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Hon. Secretary's report

Welcome

The committee of the Liquids and Complex Fluids Group are pleased to welcome you to the 2011 group newsletter. This newsletter outlines the nature of the group, its interests and relevant activities across the country.

2011 Group News

This year has been a busy one for the group. We have once again organized the winterschool "Solutions in the Snow", and it was encouraging to see so many graduate students taking part, some for the second or even the third time. The 2012 event will be held in Edinburgh, where we can likely guarantee the eponymous snow. Details are available on the LCFG website and I hope to see a number of new students, as well as old hands, joining us. The group also took part in CMMP10 at the University of Warwick, organizing the symposium "Soft Matter in Action". The committee would like to hear your opinion of this

conference, and would welcome any suggestions you may have for the 2011 meeting, to be held this December at the Lancashire County Cricket Club.

As group secretary, I particularly wish to thank all of those who have given a considerable amount time organising these activities for the benefit of everyone. I would also like to take this opportunity to remind you all that the Committee always welcomes ideas for meetings, workshops and events. The group is able to organise meetings as well as provide sponsorship for meetings organised by external parties, so do please get in touch if you have an idea for an event likely to be of interest to the community. Contact details of committee members can be found at the end of this newsletter.

I also take this opportunity to remind students of the Research Student Conference Fund, to which all student members of the Group are eligible to

apply. Funding of up to £250 is available for eligible students, and applications should reach the Institute by: 1 March, 1 June, 1 September or 1 December. Reports from previous successful applicants can be found later in the newsletter.

The Group's Early Career Prize was this year awarded to James Adams for his theoretical studies of topical problems in complex, fluid-like systems, for example shear banding fluids and structured elastomers displaying flow. James will be giving an invited talk at CMMP11.

The Annual General Meeting of the Group will be held in Edinburgh in January 2012. This short meeting is the ideal opportunity for you to comment on the present activities of the group, propose improvements, and make suggestions for future events. I would encourage as many members as possible to attend.

The LCFG committee has undergone something of a regeneration this year, with Chris Care, Rammile Ettelaie, Paul Bartlett and Patrick Warren all stepping down from committee membership. I would like to thank them all for their hard work since the inception of the group. The committee welcomes Doug Cleaver, Lorna Dougan, Suzanne Fielding and Klaas Wynne as new members.

This will be my last newsletter, and my last year as Honorary Secretary to the Group. Edo Boek will be taking over the role with immediate effect. I'd like to take this opportunity to thank you – the Group members – and the

committee for their help over the past four years.

*Cait MacPhee, Hon. Secretary,
Liquids and Complex Fluids Group*

Reports on recent group events

A report on the 2011 EPSRC/loP LCFG WinterSchool

*Stuart Clarke
Cambridge*

The fifth annual EPSRC/loP winter schools on Liquids and Complex Fluids – commonly known as 'Solutions in the Snow' – was held at Jesus College, Cambridge, in January 2011. We are pleased to report that these have been very successful and continue to enhance the community of postgraduate students working in this general area of liquid matter, by facilitating significant communication and networking, and by providing key education in a number of central topics. We are also most grateful for the support of EPSRC and the loP who support this rolling series of schools, held over a three year cycle.

The school, overseen by the Liquids and Complex Fluids Group (LCFG) of the loP, has speakers of the very highest calibre. In 2011 these were Julian Eastoe (Bristol), Matthuis Schmitt (Bayreuth), Stefan Egelhaaf (Dusseldorf) and Amelia Agglei (Leeds). The topics covered were, Surfactants, Liquids Theory, Protein Folding, and Scattering methods. The entire group is most grateful to all the speakers for giving up their time so

early in the year and for giving such excellent lectures. This provides all the attendees with a solid foundation for their present PhD studies and future work.

We are also most grateful to all the students who attended and were very enthusiastic participants in all the activities. Again feedback from the attendees has been very positive, but as usual, we are keen to consider all suggestions to improve the course structure, content and related events. The organisers also wish to express their thanks to the Staff and Fellows of Jesus College, for their hospitality and help throughout the school.

The poster sessions were again strongly supported with a vote for the 'best' with a small cash prize and a years subscription to 'Soft Matter', kindly donated by the journal. The winner of the prize this year was Siti Setu from the University of Oxford for a poster entitled "Saffman-Taylor Instability at Ultralow Interfacial Tension".

Significantly we are very pleased that many of attendees were returning students from previous years. We feel that this indicates the success of the format and we hope that this will continue. We were also grateful for the students who put themselves forward as potential student representatives on the LCFG committee. It is never easy to stand up and 'sell-yourself' in such conditions, but we are most grateful for your efforts and were pleased to



see your representative formally elected at the recent AGM of the group. We hope this will facilitate better information exchange and improve the schools even more.

The organisers also wish to pay particular thanks to Jane Snaith who has been a pillar of strength in coordinating and organising all the schools so far – 5 years- 5 Christmas and new years interrupted. Jane is retiring this year, so this was her last school. The group and all the many students send her the very best wishes for the future.

The 2012 school will be held in Edinburgh between the 8th and 11th of January. The topics for this year are: *Introduction to computer simulation of complex fluids* (Nigle Wilding, Univ. of Bath); *Membranes* (Matthew Turner, Univ. of Warwick); *Rheology* (Erika Eiser, Univ. of Cambridge); and *The Effect of Confinement on Phase Behaviour* (Hugo Christenson, Univ. of Leeds). Registration forms and other details can be found on the

group website.

CMMP10 – Soft Matter in Action

Warwick University

Neal Skipper

The Group organised a symposium on the last day of CMMP10 at Warwick in December 2010. There was a soft matter theme running through the meeting, with other sessions on Biological Physics, Polymer Physics, and Self-Assembly at Solid Surfaces. There were also Plenary lectures on Self Assembly of Proteins (by Athene Donald), Will Polymers Be Used to Make the Next Generation Nano World? (by Christopher Ober), and Understanding Liquid Crystals using Mesoscopic Computer Simulation (by Mike Cates). In addition, of course, the meeting gives an excellent opportunity to catch up with other areas of condensed matter physics (see: <http://cmmp10.iopconfs.org/>).

Our session started with an invited lecture by Pietro Cicuta (University of Cambridge) on "Hydrodynamic interactions in driven colloidal systems: a model for micro-pumps and biological flows" and was followed by six excellent short contributions including two from PhD students. These covered a wide range of themes in current condensed matter and were all followed by lively discussion. The attendance at the session was excellent (the large lecture hall was almost packed!) and I can recommend CMMP11 to everyone! Please see: <http://bit.ly/oQ1T89>

Forthcoming events

Nano Meets Spectroscopy

15th-16th September 2011

NPL, Teddington, London

Nano Meets Spectroscopy is a multidisciplinary event centred on the biosciences that will bring together leading experts and topics in fluorescence and Raman spectroscopy with common aims in the science and technology of molecular measurements. Hot topics to be covered include super-resolution microscopy, metal enhanced fluorescence, protein aggregation, single-wall carbon nanotubes and metabolic sensing.

<http://sensor.phys.strath.ac.uk/nms/>

CMMP11

13th-15th December 2011

Lancashire County Cricket Club

Manchester, UK

Organised by the Condensed Matter and Materials Physics Division of the IoP, CMMP11 offers a wide range of symposia will reflect the breadth of condensed matter and materials physics. Keynote lectures will be delivered by Professor Professor Y M Gupta of Washington State University, and Professor Andy MacKenzie, SUPA, The University of St Andrews.

Further details: <http://www.cmmp.org.uk/>

Also of interest to Group Members:

8th Liquid Matter meeting

6th-10th September 2011

Vienna, Austria

The aim of the conference is to bring together scientists working on the liquid state of matter and on closely related topics, such as soft matter and biophysics. Thus the rapidly growing field covered by

this conference series includes the physics, chemistry, biology, and chemical engineering of liquid matter as well as several areas of applied research.

<http://lmc2011.univie.ac.at/>

New outlook on molecular liquids

11th-15th Sept, 2011

Warsaw, Poland

The European Molecular Liquids Group EMLG and the Japanese Molecular Liquids Group JMLG are interdisciplinary groups covering the molecular aspects of fluids in Physics, Chemistry and Biology. This joint meeting is aimed to present the most recent experimental methods, theoretical approaches and simulations leading to better understanding of the correlations between dynamical processes in different scales of time and space, with the resultant liquid structures.

<http://femto.chem.uw.edu.pl/official/emlg/>

Physical Aspects of Polymer Science

12th-14th September, 2011

University of Surrey

The 25th meeting of the Polymer Physics Group of the Institute of Physics. With sessions on: nanostructures and nanocomposites; polymer rheology and fracture; assembly of copolymers and nanostructures; functional polymers and molecules; polymers confined in thin films, drops and membranes; fibrils, fibres and brushes; and relaxations and diffusion in confined and bulk polymers.

<http://bit.ly/nBuJot>

Workshop on biomaterials and their interactions with biological and model membranes

19th-23rd Sept, 2011

Salou, Spain

The general topic of the meeting is the interaction of synthetic polymers, nanoparticles, surfactants, proteins, small biomolecules with biological and model phospholipid membranes.

<http://biomem.sytes.net/>

83rd Annual Meeting of the Society of Rheology

9th-13th October, 2011

Cleveland, OH

<http://bit.ly/r3Yvmp>

Capturing Colloids II

11th-12th Oct, 2011

Manchester, UK

This two-day meeting will bring together a wide community of people; chemists that regularly use microscopes and image capturing techniques as a tool, with people that specialise in developing microscopical and image capture techniques within the colloids area. We will discuss leading edge science that is happening in the fields of Colloid Science, Microscopy and Image Analysis.

4th European Cell Mechanics Meeting

17th-19th October, 2011

Amsterdam, the Netherlands

Mechanical properties of cells strongly influence their biological function. Moreover, the ability of cells to actively sense and respond to environmental mechanical signals has dramatic effects on many cell decisions including cell fate. In an interdisciplinary approach, a rapidly growing field of scientists focuses experimentally as well as theoretically on various aspects of cell mechanics.

<http://www.amolf.nl/cellmech2011>

17th International Biophysics

Congress*Oct 30th-Nov 3rd 2011**Beijing, China*

During the last 20 years, Biophysics has played an ever more important role in the social and economic development of China, both as a scientific discipline and a service-providing profession. Many excellent scientific results have been achieved in the Biophysics research area during this period, and Chinese scientists in this field have published numerous papers in leading international journals, thus increasing their visibility. The main goal of the 17th IBC (IUPAB) is to maximize this opportunity to exchange ideas and discuss new advances with fellow scientists from all over the world. We also aim to encourage co-operation and interaction among the international Biophysical community, as well as build friendships.

<http://www.17ibc.org/>

Viscoplastic Fluids: From Theory to Application*November 6-10, 2011**Rio de Janeiro, Brazil*

The objective of the workshop is to bring together the leading researchers in the field of viscoplastic fluids, across several disciplines, to foster awareness and the cross-disciplinary transfer of ideas. The topics to be addressed are: phenomenology of yielding; mathematical modeling; numerical modeling; time-dependent fluids; fluid mechanics; and industrial applications.

<http://bit.ly/p1XLzw>

Jülich Soft Matter Days 2011*15th-18th November, 2011**Gustav-Stresemann-Institut, Bonn, Germany*

Workshop focusing on the physics and chemistry of mesoscopically structured systems. We hope that this workshop will provide a forum to share and discuss the latest advances for all active researchers in this field. In this years meeting we intend to focus on: Biosystems; Colloids; Polymers; Self Assembly.

<http://bit.ly/puVL6m>

Phase Transition Dynamics in Soft Matter: Bridging Microscale and Mesoscale*February 20-22, 2012**Kyoto, Japan*

By challenging strongly nonlinear and non-equilibrium soft matter theoretically, experimentally and by computer simulations, the fundamental properties of non-equilibrium phase transition are elucidated, which will initiate production of new molecular assemblies with high efficiency and functionality in material and biological sciences. On the other hand, this activity will cause new development of nonlinear and non-equilibrium physics.

<http://softmatt-net.xsrv.jp/en/symposium.html>

Colloidal Dispersions in External Fields III*19th-22nd March 2012**Bonn, Germany***Modeling Soft Matter: Linking Multiple Length and Time Scales***Jun 4th-8th, 2012**Kavli Institute for Theoretical Physics, UCSB, USA*

<http://bit.ly/rqZSNv>

**Enrico Fermi summer school -
modern developments in the
physics of 'complex colloids'**

July 3rd-13th, 2012

Varenna, Italy.

**Gordon Conference: Polymer
Physics**

July 22-27, 2012

Mount Holyoke College, MA

**The XVIth International Congress
on Rheology**

Aug 5th-10th, 2012

Lisbon, Portugal

The Congress will have fifteen symposia covering all the aspects of Rheology: Non-Newtonian Fluid Mechanics; Constitutive and Computational Modeling; Advanced Experimental Methods; Materials Processing; Interfacial Rheology, Micro-rheology & Microfluidics; Colloids and Suspensions; Emulsions and Foams; Biopolymers, Biofluids and Foods; Polymer Solutions, Melts and Blends; Associative Polymers, Surfactants and Liquid Crystals; Solids and Granular Materials; Industrial Rheology; Complex Flows; General Rheology.

<http://www.rheology-esr.net/ICR2012/>

**Gordon Conference: Water &
Aqueous Solutions**

August 12-17, 2012

Holderness School, Holderness, NH

Water colors our planet, quenches our thirst, and stimulates our imagination. Understanding the fundamental principles governing the structure and dynamics of water - and particularly how water mediates chemical interactions, reactions, and assembly processes - continues to pose formidable challenges and yield abundant surprises. The focus of this

Gordon Research Conference (GRC) is on identifying key questions, describing emerging understandings, and unveiling surprising discoveries related to water and aqueous solutions.

<http://bit.ly/pJ8wC7>

PhysCell2012

September 2-8th 2012

Hyères, France

The aim of the meeting is to bring together eminent researchers from interdisciplinary fields working on various aspects of cell and tissue biophysics including adhesion, mechano-sensing, morphogenesis, transport, single molecule studies etc. We hope to stimulate exchange of ideas between theorists and experimentalists, and between physicists, chemists and biologists. We also hope for large participation from young and emerging scientists who would benefit vastly from exposure to this eclectic gathering. A two-and-a-half-day advanced school aimed at graduate students as well as researchers at the interface of biology with physical sciences will precede the four day conference.

<http://www.physcell2012.com/>

**International Soft Matter
Conference**

16th-19th September, 2013

Rome, Italy.

Student Reports:

Recipients of bursaries from our Research Student Conference Fund here describe their experiences.

**Matthew Cheetham
University of Leeds**

American Chemical Society 240th National Meeting, August 2010, Boston USA

I would like to thank the LCF group for providing me with funds towards attending the 240th National ACS meeting which was held in Boston, Massachusetts, USA. The conference was initially a little daunting as I have never been to an event as large as this before, with so many parallel sessions to choose from. That said, on the whole I found the conference to be an enjoyable and interesting experience. I attended the entirety of the most important session to me, the session on Novel Model Systems for Supported Membranes, at which I gave my presentation. It was interesting seeing all the other work people were doing on membranes. In particular, the opening presentation by Paul S. Cremer was particularly interesting, as there were points raised that were directly relevant to my work, which I did not already know, and consequently will affect the way I do experiments in the future.

If I were giving advice to people that had not attended a National ACS meeting before, then it would be that there is a vast variety of different areas of research, and as such there is more or less something for everyone who works in the field of chemistry, or inter-disciplinary science, and it gives a great opportunity to talk to world leading scientists from all research areas and to get yourself known. I would also warn that due to the size of the event, it pays to spend time beforehand reading through the abstracts and deciding which

presentations and sessions to attend, as it is difficult finding time to do this once the event begins.

In addition to the benefits I attained from seeing other presentation and meeting people, it was fantastic being able to give a presentation there myself (which went very successfully), as I believe this will greatly help me to make myself known by other people in the field, ultimately helping my future career.

Above all of this though, and perhaps quite surprisingly, the biggest single benefit I feel I achieved from my visit was the desire to go and work in America as a post-doc once I have finished my PhD. Overall I feel the trip had been very beneficial, and for this I am very grateful.

**Aleks Ponjavic
Imperial College London**

*American Physical Society meeting,
March 2011, Boston USA*

Microelectromechanical systems (MEMS) have recently become very popular due to the unique properties they exhibit. Many such systems require nanolubrication and precise fluid transfer. In order to facilitate this, an understanding of the relevant fluid dynamics is necessary. My work is on the development of new experimental methods, to investigate the behaviour of fluids at solid liquid interfaces. This is a multidisciplinary project which can be explained using physics, studied using chemistry and has great significance in mechanical engineering.

Presenting at a conference allows gauging the quality and relevance of one's work. It also enables meeting people working on similar projects, building relations for possible future collaboration. Finally, while reading papers is very useful, it is not quite as thrilling as seeing the scientists passionately presenting their own work. I

presented my work at the American Physical Society in Dallas, March 21st.

The American Physical Society annual meetings gather some 20,000 scientists from across the world and from a multitude of disciplines, a perfect match for my work. During the conference I was able to attend some fifty talks on various topics. Given last year's Nobel Prize, it was no surprise that almost half of them were on various ways of producing and using graphene in all kinds of applications. A single atom layer filter for water sanitation? Why not! I particularly enjoyed the sessions on microfluidics and fluid mechanics.

For an engineering student at a physics conference, some of the work can seem difficult to apply. One student showed why air causes the appearance of a corona when a water droplet bounces on a surface. This is an aesthetically pleasing and interesting problem, but of what real life value could it be? If one studies the techniques used to identify the incredibly small (some nanometers) layer of air separating the water from the solid, one realizes that this could actually be useful in a wealth of other situations. In our labs in mechanical engineering, I recently found out that a similar technique is being used to study interactions between fuel and casing in jet engines, something very related to my own work. This is one of the main points behind attending conferences: the exchange of ideas and the various connections between different projects, which can spur new ideas for your own. I myself now have a solution for studying constricted transverse diffusion in microchannels, something vital to my project.

In terms of my own presentation I am very happy. Prior to the event, I was extremely nervous as it is my first presentation at an international conference, but my greatest

worry was that no one was going to attend. I then saw some thirty forty professors and students eagerly waiting and then thought that this many attendees might actually be worse. It went very well however. The questions I received were slightly difficult and very relevant, but I seemingly managed to answer them to the questioner's satisfaction. I even got some great comments from people that have written papers I cite, which is a surprisingly thrilling event when one delves so deep into a specific field.

All in all, the conference was a great success. I find my work to be on similar level to other presenters, boosting my confidence. I managed to meet and chat with some of the great minds in fields related to mine. I have also learned many new things that I did not know were possible, that will ultimately help me with my own project. Going to a conference is something I would gladly recommend to any PhD student. I am indebted to the Institute of Physics for providing me a bursary, allowing me this useful and exciting experience.

Seung Yeon Lee
University of Cambridge
International Soft Matter Conference
July 2010, Granada, Spain.

The ISMC2010 conference was very successful with bringing students and scientists together interested in soft matter systems. Young and professional scientists including myself presented either a poster or a talk to share their interests and discuss current issues. The benefits from attending the conference were not only to learn special focus of discussion and applications in the context but also to build networks and find opportunities for any future plans. It gave me a great chance to link between theoreticians and experimentalists in soft matter science, encompassing a wide

range of technological approaches and solutions. I provided a poster and received very useful comments and suggestions to solve any problems I faced. I would like to highlight that speakers could also submit their work to Soft Matter Journal.

Thank you to the Liquids and Complex Fluids Group for offering me a bursary to attend the conference.

Jens Schreckenber
Imperial College London

12th international conference on Properties and Phase Equilibria for Product and Process Design, 2010, Suzhou, China.

The conference aims to provide a forum for academic and industrial researchers to exchange ideas on the status and future trends in the field of Properties and Phase Equilibria for Product and Process Design, PPEPPD [1]. The PPEPPD was a five day conference with oral presentations during the day, of which some were invited speakers. The evenings were dedicated to poster presentations. My special interest in attending this conference was the contributions in the field of equilibrium thermodynamics.

At the PPEPPD I presented my research to the scientific community in a poster presentation. During my poster presentation I had the opportunity of discussing my work with other participants of the conference and I received great feedback. The atmosphere during the poster session was very relaxed which gave a good opportunity to approach people to discuss some of their work. The poster presentation was also useful to get to know different research areas and getting things individually explained by the presenter.

Participating in this conference enabled me to enhance my network in the scientific community. I made new contacts and maintained the existing ones. I can see myself staying in academia after I finish my PhD and with a well established network it will be helpful to start collaborations with other academics and to eventually find a suitable post doctoral position at another research institute. For this conference I was also looking forward to attend diverse talks on several scientific research areas. I gained new ideas from other researchers using different approaches for solving related scientific problems.

I especially enjoyed talking to other international and local Chinese PhD students. I met some of them at previous conferences and summer schools. This gave us the opportunity to catch up and to share our experiences about our research. I think that contacts with researchers at the same career stage are very vital.

The conference was very worth attending. I learned a lot from the scientific point of view but also I feel much more confident in approaching senior members in the scientific community. I also believe that after presenting my work on this conference other researchers will be aware of me and my work and might follow my progress.

It was also a great experience that the conference was hosted in China which enabled me to get to know the Chinese culture and hospitality. One afternoon of the conference was dedicated to a tour through the city of Suzhou. This trip gave another great opportunity to get in touch with other researchers enabling us to talk also about non scientific subjects.

In summary attending the PPEPPD was a great success because it enabled me to present my work, to get new ideas and

inspiration for my further research and to stay in contact and make new contacts

with other researchers. I thank the LCFG for their support.

Group committee

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Members of the committee welcome suggestions and comments from group members to help facilitate the running and development of the group at any time.


What is the Liquids and Complex Fluids Group?

The Liquids and Complex Fluids Group aims to advance research into the liquid state of matter, complex

fluids, and soft condensed matter by fostering collaborations between experimentalists, theorists and computer simulators working in these fields. Its scope encompasses both structure and dynamics from microscopic to mesoscopic and macroscopic length scales in systems ranging from simple liquids to all kinds of complex fluids and soft materials such as polymers, emulsions, gels, foams, colloids, liquid crystals, and their biological counterparts. The group correspondingly enjoys close links with the Polymer Physics and Biological Physics Groups of the IoP. Other topics covered include liquid mixtures and solvation phenomena, liquids and glasses under extreme conditions, confined liquids and fluids at interfaces, the glass transition and arrested states of matter (including the structure of glasses and amorphous solids), crystal growth in liquids, and self-assembly from solution.

This highly interdisciplinary field has industrial links to the pharmaceutical, petroleum and plastics, food and personal care industries, among others. The physical realisation of many ideal model systems is of interest to physicists interested in statistical mechanics, liquids, elasticity, flow behaviour and rheology, and non-equilibrium phenomena. Nevertheless, liquids and complex fluids are topics that are poorly covered in the traditional undergraduate curriculum so a distinctive aim of the group is postgraduate education, for example, via graduate schools aimed at the

exposition of basic ideas that cut across the sub-disciplines of the field. Another aim is the development of new instrumentation for work on liquids and complex fluids at UK supported X-ray and neutron sources together with sophisticated data interpretation tools. The Group therefore benefits from interactions with the Neutron Scattering Group where appropriate. Collaboration with other liquid matter researchers is strengthened through links with the Faraday Division of the Royal Society of Chemistry (the interests of many physical and theoretical chemists encompass the topics covered by our group) and through co-operation with the Liquids Board of the European Physical Society.



This newsletter is also available on the web and in larger print sizes

The contents of this newsletter do not necessarily represent the views or policies of the Institute of Physics, except where explicitly stated.

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