

Editorial

The tenth international conference on Surface X-ray and Neutron Scattering, SXNS10, has been co-organised by SOLEIL and the Laboratoire Léon Brillouin, the French national facilities for synchrotron radiation and neutron research. It took place in the premises of SOLEIL and gathered nearly 200 participants, a record for this conference series. More than twenty different countries were represented with a fair balance between Europe, America and Asia. Compared to previous occurrences, a large place was given to oral presentations whether invited or contributed (49 in total) with still an important number of poster presentations (130). Two best poster prizes were awarded to Alina Vlad from MPI Stuttgart for her work on oxyde formation on NiAl and Lilach Tamam from Bar Ilan University for her work on Langmuir monolayers on mercury.

One of the main objectives of the SXNS conferences is to stimulate more collaboration between the X-ray and neutron communities. Although the techniques are complementary the users sometimes only coexist without collaborating. In view of this, the conference was a success since both communities were almost equally represented and there was ample opportunity to intermingle and learn thus from each other. A visit of the French neutron and synchrotron facilities provided another opportunity to apprehend the progresses in surface scattering instrumentation.

All this resulted in an intense exchange of scientific information in a field which is seen to expand along directions unexpected when the series was launched in 1989. The two main broad topics were concerned with “Structural aspects of surfaces, thin films and nanostructures” and “Soft matter and Liquids issues” but full sessions were also dedicated to magnetic thin films, imaging and dynamics with coherent beams, bio-related interfaces, state of the art instrumentation and New Facilities. Pluridisciplinarity is indeed the keyword and the classification into the listed topics has been difficult so intricate are now the implication of low dimensionality aspect in the materials properties for all disciplines in basic and applied research. The feeling was that this conference has not lost its meaning and is still in the forefront of advancing science. A rapid synthesis of the important aspects developed during the conference is given below.

Traditional areas of surface scattering are still an active field, with nanostructures playing an increasingly important role. Very precise studies are often coupled to simulations or DFT calculations which provide together a thorough understanding of surface phenomena. Among the presented topics, one can quote the investigation of surface elasticity, DAFS studies of quantum dots, adsorption of various kinds of molecules on surfaces, including subtle effects with C₆₀, self-assembly combining X-ray standing waves and reflectivity, orbital ordering at surfaces . . . There was also an increasing number of studies addressing (almost) real devices like tunnel junctions or rolled-up nanotubes, and a large number of real-time studies, for example of deposition or coalescence of nanoparticles.

In magnetism, impressive studies of the magnetization profile in a multilayer using resonant x-ray reflectivity were presented and the complementarity between neutrons and x-rays was emphasized, together with the role of interfaces and magnetic roughness.

Another field where X-rays and neutrons are complementary is soft matter. Here again, very precise studies, for example on ions at liquid-liquid interfaces or organics on the mercury surface were presented together with studies of systems used in real devices like “grafted-from” brushes, the use of thermoresponsive NIPAM as a barrier, diacetylene films, or titania surfaces. The use of spin-echo in friction studies or of suspended membranes between possibly asymmetric liquid compartments look promising and could lead to important results.

The field is also exciting because of all the developments which are taking place. First liquid reflectometry results from the Spallation Neutron Source (SNS-Oak Ridge) were presented as well as first results from FLASH (DESY-Hamburg) in time-resolved magnetism, and it is already expected that more results from fourth generation synchrotron sources will be presented at the next conference. Among the other developments, first results are coming using spin-echo coding for reflectivity studies, a concept which has been discussed for a while. Also in reflectivity, the use of resonant reflectivity at the carbon edge for organics was shown to be very promising. Another impressive development was that of an energy dispersive setup allowing one to record reasonable reflectivity curves in a millisecond.

Obviously, the use of coherence for lensless imaging is another very important development. Precise determinations of the strain in nanoparticles and zeolites using this technique were presented, and new ideas were extensively discussed.

The structure of the current issue reflects this diversity and is organized along the following sections: “Film Growth, Surface Structure and Nanostructures”, “Resonance and Magnetism”, “Coherence”, “New Instrumentation and Methods”, “Soft condensed Matter and Liquids”, and “Membranes and Bio-related interfaces”.

We wish to acknowledge the financial support from the following institutions: Région Ile de France and C’Nano, RTRA-Triangle de la Physique, Commissariat à l’Énergie Atomique, Centre National de la Recherche Scientifique, Synchrotron Soleil and Laboratoire Léon Brillouin. We appreciated the invaluable help of the international Program Committee.

The next SXNS conference, SXNS11 will be held in 2010 on Northwestern campus, Evanston, IL.

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