M06.CC X-ray and Neutron Complementarity

Chair: B.Lebech
Co-Chair: J.W. White

Attendance: 135

The micro symposium included five invited talks covering a diversity of studies and attracted a large audience indicating that the subject was is of general interest to the crystallography community. The lecture room was quite full at the start of the symposium and although there was an exchange of the audience during the symposium, the lecture room was still about half full by the end of the symposium.

The symposium started by an excellent overview reviewing the developments of both techniques during the last ten years. It was stressed that the techniques developed for the two radiation probes are catalytic and truly complementary. This was brilliantly illustrated in the following talk describing the Ping-Pong played between the two techniques in a case study of the magnetism in a anomalous non-superconducting member of the (*RE*)$Ba_2Cu_3O_{6+x}$ series, where the element specificity of resonant x-ray magnetic scattering has shown unambiguously that the *RE* (= Pr) does order and led to the discovery of an incommensurable modulation, which neutron magnetic energy resolved scattering has shown to be static. Next followed an informative talk on the novel technique in neutron scattering - Spherical Neutron Polarimetry - which can give access in (***Q***, ω) space to sixteen measured quantities related to the sixteen independent correlation functions involved in the most general mixed nuclear/magnetic neutron scattering process. Hereafter we turned to life sciences and structural biology. It was pointed out that based on only x-ray studies any detailed discussion of protonation and hydration can be only speculative, while neutrons provide an experimental technique for directly locating hydrogen/deuterium atoms. We also learned of the development of a highly efficient neutron imaging plate with a dynamic range of 1:10^5 and spatial resolution of less than 0.2 mm. The last talk was an enlightening study by small angle neutron and x-ray scattering (SANS and SAX) of block copolymer micelles with special emphasis on isotope effects. We heard how optimal information on the structure are obtained by SANS from neutron contrast variation measurements and how, by using pure deuterated or hydrogenated solvent, the core and the corona can be measured separately, while mixtures provide information on the interference term.

Brent LeBeck