

Preface

“Among the many well-known fundamental and applied consequences of neutron discovery, one of the first was the emergence of structural neutron diffraction - one of the methods for studying the spatial structure of condensed matter at the atomic level. Investigating the dynamics of biological macromolecules by neutron diffraction methods is an area that is almost untouched. We believe that also in this direction one should expect rapid progress.”

Yu.M.Ostanevich and I.N.Serdyuk
Uspekhi Fizicheskikh Nauk (1982)

More than 30 years after Ostanevich and Serdyuk reviewed the then 50 years from the neutron discovery, we are happy to support their statement and prediction by reporting on the further progress in the field of neutron scattering research. Frank Laboratory of Neutron Physics has organized the III International Conference on Small Angle Neutron Scattering (YuMO2016) that was – not coincidentally – dedicated to the 80th anniversary of Ostanevich.

Yuriy Mechislavovich Ostanevich (1936–1992) has had a determinative and crucial contribution to the construction of spectrometers at the pulsed reactor IBR in Dubna, Russia. He contributed in particular to the development of time-of-flight small-angle neutron scattering (SANS) technique, and the selection of advanced scientific areas for its application. The SANS instrument at the IBR-2 reactor is called YuMO in his honour. The Ostanevich’s leadership and outstanding scientific achievements in SANS studies of polyelectrolytes, small molecules, fractals, metallic glasses, macromolecules, polymers, etc., were recognized also by a number of awards including the State Prize of the Russian Federation in 2000. To this end of course, we should not forget mentioning the contribution of close collaborators of Ostanevich: Laszlo Cser, Josef Plestil as well as Alexander Kunchenko, Vadim Bezzabotnov and Nikolay Gorski.

The YuMO2016 conference focused on providing opportunities to discuss various possibilities of exploiting the SANS technique in the many aspects of condensed matter research as once appreciated and predicted by Ostanevich, and perhaps even surpassing his predictions. The FLNP have had an opportunity to welcome more than 110 participants from 14 different countries and 3 continents comprising Europe, North America and Australia. The scientific program was filled with 43 oral presentations extending over 930 minutes, while more than 60 posters were presented during the poster sessions and breaks.



The content of the conference and its proceedings are fully commensurate with world-wide trends in neutron scattering applications. The contribution dedicated to the SANS methods and instrumentation describes for example a role of polarized neutrons in the localization of free radicals in the structural biology. It is hard to imagine another probe than neutron, and another technique than small-angle scattering that have such many utilization possibilities in the studies of drug delivery systems, neurodegenerative diseases, and other aspects of biomembranes and soft matter in general, to name but a few.

Besides the neutron's sensitivity to the light elements, and H/D differentiation making the hydrogen-rich biomaterials an innate target, magnetism is accessible to neutrons too. Our proceedings document studies where neutron scattering techniques come to the rescue when other methods have failed, and/or provide examples of synergy between the various methods. Atomic force microscopy, NMR, Raman spectroscopy, molecular dynamics simulations, and X-ray scattering are clearly the complementary methods of choice for condensed matter research. It is a matter of time, and already happening future in some cases, for the studies concerning nanoparticles and nanocomposites to spin-off into advanced and industrial applications.

It is more than intriguing to realize the role of neutrons and/or small angle scattering method in such studies across various scientific fields. The neutron history is written by those who touched the neutron. Let us pay a tribute to one of them. We are fortunate to open our collection of YuMO2016 conference dedicated to the 80th anniversary of Yu.M. Ostanevich by the very personal commemorations of his close colleague and friend Dr. Laszlo Cser.

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