

Tribute to Oleg S. Vasyutinskii

With this special issue of *Molecular Physics* we celebrate the life and scientific career of Oleg S. Vasyutinskii. For many decades Oleg has been a leading figure in both the theoretical and experimental treatment of photofragment angular momentum polarization, but in the last ten years his work has undergone a major transformation and he now leads a very active biophysics research program. This change testifies to his agile mind and ability to create new opportunities and make new connections. Oleg's countless collaborations around the world also highlight these same virtues. Those of us fortunate enough to have joined him in these pursuits have been deeply rewarded by his sharp insight, his profound understanding of polarization phenomena, and his wit and charm.

Oleg S. Vasyutinskii was born in St. Petersburg (Leningrad), USSR on January 8, 1951, and he has called St. Petersburg his home ever since. Oleg is unmistakably a man of St. Petersburg, a city that stands as a jewel of culture and connection to the west that, at the same time, holds much of Russia's cultural treasure in its heart. After earning his B. S. at Leningrad Technical University in 1974, Oleg went to the Ioffe Physico-Technical Institute and that has since been his scientific base, albeit with frequent adventures away for collaborative work. He earned his Ph.D. there in 1984 under the direction of R. A. Zhitnikov with a thesis entitled "Orientation of atoms in molecular photodissociation," anticipating a career engaged in pioneering explorations and explanations of these effects. He then served as a staff scientist at Ioffe until 1992 when, with the dissolution of the USSR, he was able to move to Paris for a post-doctoral position with Michele Glass-Maujean and Alberto Beswick. This joint effort gave rise to an extremely important foundational paper in the field discussed below. Oleg approached one of us in 1995 to initiate a collaboration under the auspices of the US Civilian Research and Defense Foundation, a public-private partnership established by George Soros and the US Department of Defense to connect scientists of the former Soviet Union to the west. He had immediately recognized the potential of ion imaging methods to reveal orbital polarization effects, and this inspired notion led to visits to Berkeley in 1995 and a fruitful and rewarding collaboration that has given rise to twenty joint publications. This was the first of 14 international collaborations Oleg has been involved in, from the US to Taiwan, Cuba, China, and throughout Europe and the UK. He received an International Alexander von Humboldt Research Award in 2001 that led to collaborations in Germany with D. Zimmerman and K.-H. Gericke, leading to further collaboration in Braunschweig as a DAAD visiting professor.

Although it will be impossible to recount all of Oleg's major scientific contributions in this limited space, it is important to note a few of them. In the early 1980s he predicted production of spin-polarized atoms in photodissociation by circularly polarized light, including spin-polarized hydrogen and demonstrated this in several systems. In 1995 he published the key paper mentioned above describing the full quantum theory of photofragment vector correlations in the axial recoil approximation on which rests all theoretical description of these phenomena. In 1997 he presented a set of anisotropy parameters containing complete information on the dynamics of the photodissociation of diatomic and polyatomic molecules

including coherent and incoherent dissociation mechanisms. This approach was then used to analyze Doppler and ion imaging data, with the latter revealing a coherent nonadiabatic dissociation mechanism in Cl_2 . This approach has since been applied to many diatomic and polyatomic molecules. He then extended this theory for anisotropy and polarization beyond the axial recoil limit, developing expressions describing the angular momentum distribution of the products of any chemical or photochemical reaction. Recently he has turned to femtosecond studies in biomolecules, pioneering an approach to investigate their dynamics using a two-color two-photon excited polarized fluorescence. He has also developed powerful new methods of digital holographic microscopy with applications cancer diagnosis and drug screening.

As noted above, Oleg's research is highly collaborative. In addition to the intellectual rigor with which he imbues such scientific interactions, he also brings great company and an infectious humor. He engages in perceptive dry witticism as enthusiastically as vigorous scientific debate.

His work has been recognized with many awards, including the Award of the St. Petersburg Physical Society, the Humboldt Award, and the Konstantinov Award of the Ioffe Institute. He is a Fellow of the Institute of Physics of the UK and an Academician of the Russian Academy of Natural Sciences. He serves on the International Advisory Board of many conferences including ICPEAC, MOLEC and the Conference on Stereodynamics in Chemical Reactions, and he served as Conference Chair for the latter two. Oleg's work continues very vigorously both in his pursuits in biomolecules and oncology at the Ioffe Institute, and in ongoing collaborative work on photofragment orbital polarization. We look forward to many more years of exciting advances from his efforts.

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