

An Afternoon Discussion With A Scientific Giant: Vladimir (Volodya) Agranovich

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During the Christmas break of 2003, everything was quiet and peaceful in the University of Texas at Dallas. I took the opportunity to have several uninterrupted moments in an afternoon with a great scientist Vladimir (nick name “Volodya”) Agranovich in his office in UTD’s NanoTech Institute. He is spending six months at UTD as one of the University’s prestigious “pioneers in nanotechnology.” There also will be a major SPRING Topical Symposium on January 22nd – 24th, 2004, entitled “21st Century Research in Matter: “Photonic, Excitonic, Spintronic Processes in Nanostructures“ in honor of his 75th birthday (<http://www.utdallas.edu/research/event040122.htm>).

One of the greatest joys I acquired since coming to the University of Texas at Dallas is to meet many new friends, from world class scientists, to entrepreneurs, to musicians, and many others of all walks of life. In science, one of these individuals, because of his profound contributions in science, I have always considered him a scientific maestro.

He is Volodya!

Volodya is not just a great scientist, but a fantastic teacher. He said that “every scientist should be happy about new scientific results, even if the results were not obtained by himself/herself!”

To date, he told me that he has produced over 35 doctorates and at least 20 of them are leading members of the scientific community. I could detect the pride in his voice when he told me that two of his scientific offspring, Anvar Zakhidov, his student and Yuri Gartstein, his grand-student, are faculty members of UTD. I could also detect from his voice a touch of sadness, and deep regret, when he said that for so many years, when the Soviet Union and the United States were not in the best of terms, he was unable to teach students from the West.

Volodya is a man of deep humanity. Even in the worse of times in the Soviet Union, he promoted scientific exchanges between the United States and USSR. One of his aims is to promote peace among all nations, especially those between the US and USSR. In fact, it was the Herculean effort of his and his colleague Alex Maradudin of the University of California at Irvine, who also is a great scientist (and a speaker at this Symposium in January), that they produced one of the most outstanding series of scientific volumes (over 35) in the science of materials in the past 20 years.

It is no surprise that when UTD announced that we are celebrating Volodya's 75th birthday here in Richardson, the world of science descended on us. Top scientists from all corners of the globe were more than willing to come celebrate this occasion with us.

Volodya told me that he belongs to the "Institute of Spectroscopy," which is a part of the Russian Academy of Sciences. This institute is located in the suburb of Moscow called Troitsk. Remarkably, even though the institute was formed in 1968, Volodya immediately became the head of the theoretical group in 1969, some 35 years ago. In the past 35 years, the institute became one of the scientific research powerhouses in Russia under the leadership of Volodya, V. Letokhov, R. Personov, G. Zhizhin and the Director the late S. L. Mandelshtam. Interestingly, S. L. Mandelshtam was the son of the late-Academician Leonid Mandelshtam, which was unquestionably one of the great early Russian physicists, who created the Moscow School of Physics.

Why spectroscopy? While I am not a linguist, I believe the word "spectroscopy" is derived from "spectra", which according to Cambridge Dictionary, is "the set of colors into which a beam of light can be separated, or a range of waves, such as light waves or radio waves". This is of course not a scientific definition. However, it does say that something must separate the beam of light, and how it is separated can tell you about that something. Roughly speaking, that separation, is what we now refer to as "spectroscopy"!

"Modern materials," according to Volodya, "whether they are semiconductors, conducting polymers, nanomaterials or DNA structures, all require us to learn about their microscopic structures before there is any hope of turning them into devices." To learn about these microscopic structures, which all cannot be seen by the naked eyes, one needs to disturb the materials by either shooting laser light, or electrons of high energy (such as electron microscope), or protons of high energy (such as the cyclotrons used in hospitals) on them. Through such disturbances, one can learn, or deduce, the structures of such materials. The data originated from such disturbances are called, just as the definition of the Cambridge dictionary, "spectroscopy". Thus, if the material is primarily molecular in nature, it is called "molecular spectroscopy". If it is atoms, it is called "atomic spectroscopy".

Therefore, it is not surprising that the great Russian institute, where Volodya is the head of the theoretical group, is an important one because it studies the "spectroscopies" of all matters, from atomic, molecular and all forms of matter in the solid (or liquid) form.

Of course, nowadays, one needs to study the spectroscopy of "nanomaterials", said Volodya.

I asked Volodya what "laser spectroscopy" is when laser is a tool and not an object to study. With a smile on his face, he said that "ahhhhhhhhhh, that is scientific politics. At the time the Institute was created, everything one did had to have the name "laser" attached to it. So, even if it didn't seem logical, the term laser-spectroscopy was nevertheless used!"

Our discussion then turned to the SPRING Topical Symposium in January 22 – 24. I could tell Volodya was on the one hand, enormously pleased that such an event is taking place (to honor his 75th birthday), but on the other hand, his genuine humbleness made him quite embarrassed by it all.

He immediately said that “you know, all invited speakers coming to the symposium are giants. They have all made, and continue to make, fantastic scientific discoveries.”

“I simply cannot wait to listen to and learn from each and everyone of the lecturers. I know everyone will have something fantastic to tell the audience,” said Volodya.

Volodya then gave me examples of great work done by some of the speakers. “Take the case of my old friend Eli (Burstein). You know, he is the first one to demonstrate surface spectroscopy. His work simply revolutionized not just science, but technology!”

“Then there is my other old friend Robin (Hochstrasser). You know, Robin is one of the first persons to work on organic materials and molecular crystals. His work has profound impact on what we now call light emitting diodes, LED”, he said.

“What about Ron Shen,” I asked. I have known Ron’s reputation for over 25 years now when he was already one of the role models for the young Chinese American scientific communities then. “Well, Ron’s contribution in science is from A to Z. Like all the scientists who are coming, he is brilliant! Ron is one of the pioneers of laser isotopic separation and his book is a yeoman’s work in the field of non-linear optics”.

Volodya looked at me and said: “You know, Da Hsuan, I can go on and on about everyone who is coming. People such as Manuel Cardona of the Max Planck Institute, Alex Kaplyanskii of Ioffa Institute in St Petersburg, Claude Weisbuch of Ecole Polytechnique and Steve Forrest of Princeton, and so on are all great great great scientists and teachers. You must remember that not only they made great discoveries, but their students have done incredible work.”

“Without these individuals, I believe that material science may not be what it is today!” Volodya exclaimed!

I left Volodya’s office a little wiser.