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A word about Nikolai Gennadievich Basov

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Nikolai Gennadievich Basov would have been 85 on 14 December 2007, and now immediate recollections about

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him both as an outstanding physicist of the XX century and a man who is still alive ponder in the memory of his numerous pupils, his ‘sons’ and ‘grandsons’. Wherever and whatever occasion we meet, we always begin to talk about the way Nikolai Gennadievich would behave in such a situation or what he would say. Being a very gifted and creative person always adopting an active life position, Nikolai Gennadievich spent very much time with his pupils and colleagues.

Therefore, before to write about Nikolai Gennadievich, I pondered over what and how to say about this extraordinary man.

Of course, the simplest solution is to attempt to tell about the main works of Nikolai Gennadievich, but in this case there is always danger to miss something and it is not clear where the border between the main and minor can be drawn. So, maybe in such a short article it is reasonable to dwell upon some individual impressions, which, although far from being complete, better reflect the style of the professional activity of Nikolai Gennadievich.

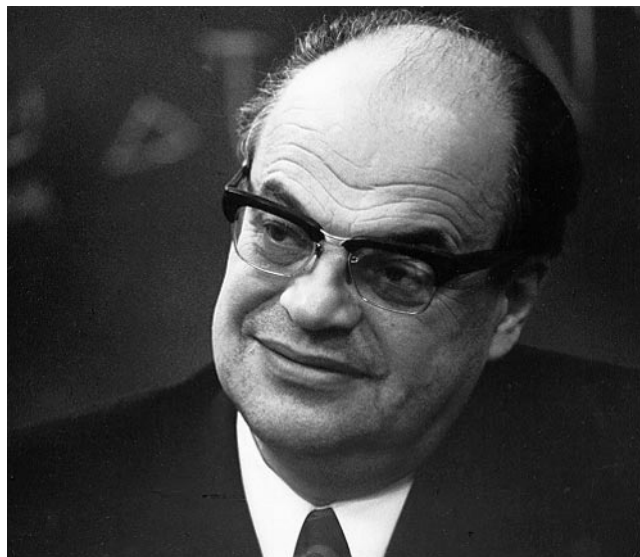
Above all, the colleagues and collaborators of Nikolai Gennadievich know that quantum radiophysics, or maybe more exactly, laser physics attracted permanent interest of N.G. Basov. Already about 47 years ago, when lasers just appeared, Nikolai Gennadievich predicted in fact a new revolution in science and technology initiated by this discovery. Many believed at that time that this was a great exaggeration. However, the time proved that he was right. It is just now that lasers are increasingly used in modern technology, being employed in a variety of fields, from endoscopic and eye operations to transcontinental communication lines and internet, and from very precise measurements to compact discs, laser printers and laser machining of materials in machine building. It is obvious that such a long period of above 30–35 years, which was required for the beginning of extensive practical applications of this fundamental discovery, can be explained by the unusualness of the discovery, which gave to the mankind a new technological basis, and by the necessity to reconsider the accepted technological concepts. We can only wonder at the amazing intuition of Nikolai Gennadievich – and these are not just fine words, because I remember well a skeptical attitude of many to his predictions. By the way, I would like to mention here that Dmitrii Vladimirovich Skobel'tsyn, director of the Lebedev Physics Institute, always supported Nikolai Gennadievich, and Petr Leonidovich Kapitza was always interested in the reports of Nikolai Gennadievich in this field.

Second, that which seems to me very typical for the scientific creative power of Nikolai Gennadievich, was his



great interest in the real things that can be created, i.e. in obtaining an effect, rather than observing it simply. Therefore, I risk to say (understanding that this is open to argument) that Nikolai Gennadievich was never in fact engaged in ‘observational’ physics during his entire scientific activity, although he was interested in such studies, for example, radio astronomy.

Finally, I would like to point out another feature of Nikolai Gennadievich – a remarkable logic of his thought. It seems sometimes that the thoughts of Nikolai Gennadievich developed not in the simplest way, from the foundations of physics described in textbooks to more complicated concepts, but followed an exactly opposite way – from a final result. There is the well-known story that I heard from my colleagues working with Nikolai Gennadievich in the mid-1950s. The story concerns the question about the linewidth of a maser. Nikolai Gennadievich believed that the maser linewidth observed upon stimulated amplification can be narrower than the natural linewidth of the transition. They



say that L.D. Landau, to whom Nikolai Gennadievich appealed to discuss this problem, rejected such a possibility because it seemingly contradicted the uncertainty relation. However, later this phenomenon was explained taking into account the fact that molecules flying into a resonator and leaving it in a certain quantum state, which is the same for all molecules in the ensemble, are indistinguishable.

It seems that Nikolai Gennadievich always constructed the model of a phenomenon in his own specific way, his concept often being different from and probably more complicated than those proposed by his colleagues. I think that for this reason, it was difficult for us, his pupils, to understand sometimes the logic of his reasoning during discussion with him because he assumed probably that we already passed in our thoughts the part of the road that he himself already had gone.

I am sure that it is this feature of the professional approach of Nikolai Gennadievich that was the main reason for remarkably bright ideas that he put forward during his creative life. If at least one of the ten ideas or proposals is realised, it is considered as a great success. The realisation coefficient of ideas of N.G. Basov was much higher.

Nikolai Gennadievich passed away on 1 July 2001, and it came as a crushing blow to Russian physics and Russian Academy of Sciences and a devastating grief to his pupils and colleagues. In the disgusting for Russian science 1990s, N.G. Basov was one of those who did his best to defend and support our science. He claimed uncompromisingly appealing to the Government and community of our country: ‘Science should not be treated in such a way’. He understood that, being a very fragile substance, science could not defend itself, and its destruction would be a misfortune for our society, while its recovery would be extremely difficult. So far, unfortunately, the crisis has not been overcome and new tendencies which have appeared recently do not stabilise the shaken foundation of our science.