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PERSONALIA

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Vladimir Borisovich Braginsky (on his 80th birthday)

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Vladimir Borisovich Braginsky, the outstanding experimental physicist and Corresponding Member of the Russian Academy of Sciences (RAS), celebrated his 80th birthday on August 3, 2011.

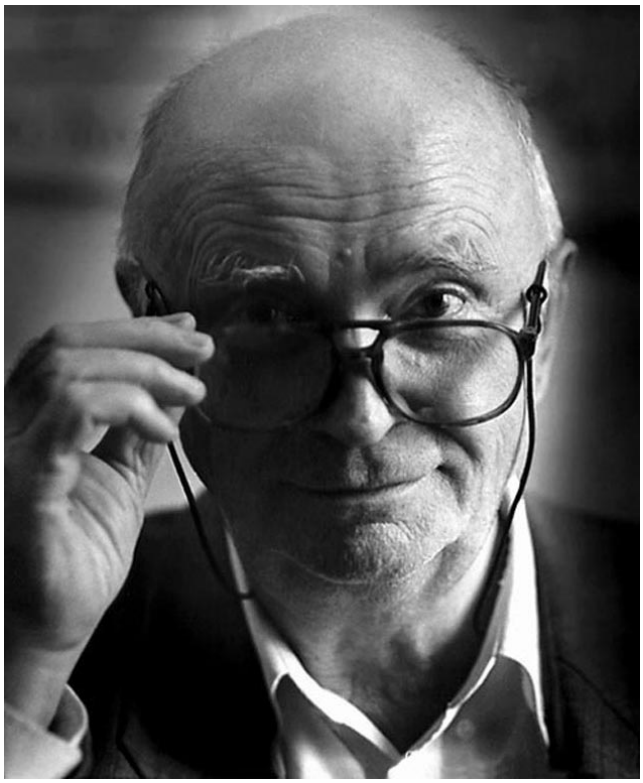
V B Braginsky came into experimental physics in 1955 while still a student in the Physics Department of Moscow State University. After graduation he stayed at the department as senior laboratory assistant. From that time on, V B Braginsky continued to work at the Physics Department.

In 1955–1964, he worked on the problem of mutual synchronization of clystrons and applications of transition radiation in microwave electronics. In 1965, V B Braginsky was the first to understand that a considerable untapped reserve of sensitivity existed in experiments with test masses, provided the friction is sufficiently low: if relaxation time is much longer than the time of measurement, it becomes possible to record changes of energy in the oscillator much smaller than the equilibrium thermal energy. V B Braginsky was able to demonstrate this experimentally. Furthermore, in 1967 he predicted the existence of limits of quantum origin on sensitivity, now known as standard quantum limits.

In 1964–1975, V B Braginsky and his colleagues performed a number of experiments with test bodies. We wish to specially point out the following among them. His experiment searching for free quarks with fractional charge established the equality of the absolute values of electric charges of the proton and the electron with the accuracy of 10^{-21} (1970). He also showed that the equivalence principle continues to hold on the level of 10^{-12} at the confidence level of 0.95 (1971). When elaborating various techniques for experiments with test masses, he was able to predict several important effects, such as electromagnetic rigidity, radiometric instability, pondermotive radiative instability and light-induced friction, which these days play a big role in opto-mechanical experiments at the quantum level.

While elaborating the quantum theory of measurements, V B Braginsky suggested and provided the theoretical foundation for the principles of a new class of quantum nondestructive measurements in which the possibility appears to go beyond the standard quantum limits (1977). For instance, it is possible to use these measurements for the nonabsorbing counting of light quanta. He also suggested a method of implementing such measurements for the optical range of frequencies by utilizing cubic nonlinearity (1980). In subsequent years this class of nondestructive measurements was successfully realized in several laboratories in the optical and the microwave ranges.

In 1974, V B Braginsky and his colleagues started to develop several new methods of reducing dissipation (increasing the Q factor) in mechanical, microwave, and optical resonators. Thus, they created dielectric resonators for the microwave and optical ranges with 'whispering gallery' type modes having a Q factor above 10^9 (1988), and mechanical pendulums with a relaxation time of more than five years at room temperature and a Q factor of about 2×10^8 (1988). Several laboratories were able to build secondary frequency standards with a record narrow linewidth based on dielectric resonators. High-Q mechanical pendulums are used in the suspension of mirrors of gravitation-wave antennas, providing sensitivity at the level of the standard quantum limit, which corresponds to the metric perturbation amplitude $h \approx 10^{-22}$.



Vladimir Borisovich Braginsky

Among V B Braginsky's other important accomplishments we need to emphasize the prediction of fundamental resonance friction caused by zero electromagnetic fluctuations (1991) and the decoherence effect of wave functions of charged masses caused by the same fluctuations (1995). He predicted, in collaboration with his colleagues, the existence of a new class of fluctuations of nonlinear origin in solids: thermoelastic (1999), and thermo-refractive (2000).

V B Braginsky has authored more than 250 papers and four monographs.

V B Braginsky devotes much effort to pedagogical duties. He possesses a brilliant ability to attract highly talented

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young people to devote themselves to research. V B Braginsky has supervised 34 future PhD researchers, of which 12 later obtained DSc degrees. Six of them are now professors of various chairs in the Physics Department of Moscow State University.

V B Braginsky's fruitful research and teaching activities have earned him the well-deserved respect of the physics community. He received the P N Lebedev medal (awarded by the Presidium of the USSR Academy of Sciences in 1975), the F Schiller medal (Iena University, Germany, 1980), the Fairchild Prize (CalTech, USA, 1990), and the Humboldt Prize (Germany, 1993). He was elected Corresponding Member of the RAS in 1990, then a member of Academia Europaea (1995). In 1999, he served as the Angstrom Lecturer at Uppsala University (Sweden). In 2004, he became an honorary foreign member of the American Academy of Sciences and Arts, and in 2006 became a Foreign Associate member of the USA National Academy of Sciences.

Colleagues, disciples, and friends of Vladimir Borisovich Braginsky extend all the best to him on this jubilee and wish him good health and a long string of creative achievements.

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