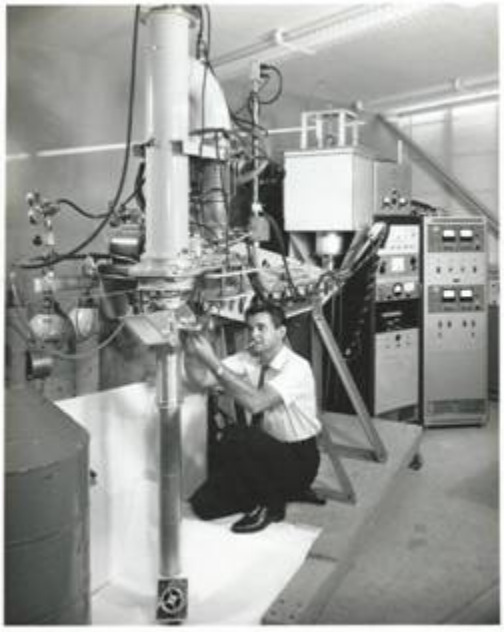
GEORGE M. SAFONOV (BS ’43, MS ’48, PHD ’49)

1920–2014



George M. Safonov (BS ‘43, MS ‘48, PhD ‘49) was a nuclear physicist whose scientific career was distinguished by unconventional solutions which often took him soaring high above the crowd upon the plain into as yet uncharted, even unimagined, realms. He passed away at age 93 on June 1, 2014 following a brief illness in Santa Monica, CA.

He joined RAND Corporation in Santa Monica, California in 1949 where he worked alongside such notable physicists as Samuel T. Cohen, Arnold Kramish, and the brothers Richard Latter and Albert L. Latter. During this period he concentrated on theoretical and experimental work on fission-chain reacting systems. In the early 1950’s, he worked briefly with Edward Teller and John S. Foster, Jr. of the Lawrence Radiation Lab on the analysis of certain weapons, including the first Lawrence Livermore Laboratory weapon successfully tested in Nevada. He developed equations permitting the survey of critical parameters of the connected spectrum of fast to slow reactors and published in the proceedings of the second Atoms for Peace Conference his equations and surveys of a new class of reactors - the externally moderated systems. One such system, the cavity reactor, lent itself to the direct conversion of fission fragment energy to electricity. He demonstrated this conversion concept via experiments on cells irradiated at two neutron-source reactors. In 1963, he left RAND and founded Advanced Concepts Technology Inc. (ACT) to commercialize the direct

electric conversion technology. When ACT was unable to continue in 1969, he joined TRW in Redondo Beach, CA and then in 1972 he joined RAND spinoff R&D Associates in Marina del Rey, CA.

During the early 1970s he identified cavity reactor systems where fission fragments would pump high-power lasers. The fission-laser concept was later demonstrated by other workers using his basic cell design. Invited lectures on his various fission-related works were presented at Caltech, UCLA, UCB and also at Stanford where he supervised a Ph.D candidate's fission-fragment research. In the 1980's, he studied various peaceful and military applications of fission and the use of particle beams for missile defense, also known as 'Star Wars'.

After his semi-retirement from R&D Associates in the early 1980s and through 2005, his focus shifted to developing ideas on cosmology that had been in the back of his mind since his student days at Caltech. He worked to bring into coarse focus important features of an unconventional steady-state universe model which he called the Photon-Nonphoton Universe—see www.photon-nonphotonuniverse.com/. The model involves the symbiotic coexistence of two basic particle species: photons and nonphotons (i.e., photons fuse to form nonphotons which fission into photons). By combining old Caltech-era ideas on particles and the methodologies used for his fission-system studies with a simple approach to Planck's photon spectrum, a rough definition of a photon-nonphoton universe's features became possible.

George was born into a family of Russian nobility during the Russian Revolution on November 19, 1920 in a British army hospital in Basrah, Mesopotamia where his father, mother, brother and others in a group of refugees found temporary asylum after fleeing the advancing Red Army across the Caspian sea to Persia and then overland to Basrah. The ship which carried the refugees on the Caspian leg of their journey was commanded by George's father Mikhail Ivanovich Safonov, a decorated WW-I flying ace and officer of the Imperial Russian Navy. After a brief stay in Basrah, the family traveled via Bombay India to the Russian city of Vladivostok which was still under White Russian control. There they remained until October 1922 when advancing Red Army forces again forced the evacuation by sea of the loyalist White Army forces and their families. This time the Safonov family found refuge in China where George's father was commissioned by the Nationalist Chinese

Navy to advise on the construction of a flying boat at the port of Mamoi located at the mouth of the Ming River near the city of Foochow.

Early one morning in May 1924 George witnessed his father's death as the flying boat crashed and overturned in the river during a test flight. After his father's passing, George's mother Ludmila Tschebotarioff Safonov resolved to immigrate to the United States with her two children. Arriving in 1926, she chose to settle in Pasadena, California because she thought her five year old son George, who had already shown distinct inclinations toward engineering and scientific research, would benefit by the educational opportunities offered there. The family soon became friendly with several Caltech faculty and patrons who proved profoundly influential in shaping George's life. As a teen in the 1930's, George became well acquainted with Caltech physics professor J. Robert Oppenheimer who later went on to head the WW-II Manhattan Project and with Oppenheimer's younger brother Frank who later founded the San Francisco Exploratorium. The Oppenheimer brothers were frequent guests at George's Pasadena home where Frank Oppenheimer, usually accompanied by his German shepherd dog "Pushkin", tutored George's older brother Michael in mathematics in exchange for Russian lessons from George's mother.

In 1939 George entered the California Institute of Technology where for the next ten years he studied and worked. Soon he met and fell in love with Ruth Garnet Ware whom he married on Christmas Eve December 24, 1940. At Caltech, he earned a BS (1943) in electrical engineering and an MS (1948) and a Ph.D (1949) in physics while working on cloud chamber experiments with postdoc Bernard Hamermesh, classmate Donald Glaser and Profs. Robert B. Leighton and Carl D. Anderson. During the war years, he had worked under Anderson on Caltech's rocket program (exterior ballistics); and, during the postwar years, he taught undergraduate physics at Caltech.

From 1950 until his children left home, George and Ruth lived in Pacific Palisades, California. Around 1976 the couple moved to a seaside high-rise in the Ocean Park area of Santa Monica, California. Ruth passed away there in November 2007. After the loss of Ruth, George drew ever closer to his children and grandchildren, all of whom he loved dearly. He is survived by his children daughter Anna Michele (Dawn) and three sons Michael, Nicholas and Gregory Safonov, six grandchildren Melissa (Dawn) Laskey, Colleen

(Dawn) Karotkin, Alexander, Peter, Hayley, and Marshall Safonov, and by several great grandchildren.

His Santa Monica neighbors and acquaintances will remember old “Doctor George” as an absent-minded ever-charming wit with a warm smile. His children and grandchildren will remember him both as an inspiring role model and as a gifted teacher who helped them make child’s play of their mathematics and physics homework and inspired them to think independently, to find resolution to their questions, and to strive to soar high above the crowd.