

In memory of Valentine Telegdi

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Valentine Telegdi — Val to his friends — an outstanding physicist and Foreign Member of the Russian Academy of Sciences, departed this life on April 8, 2006 in Pasadena (USA).

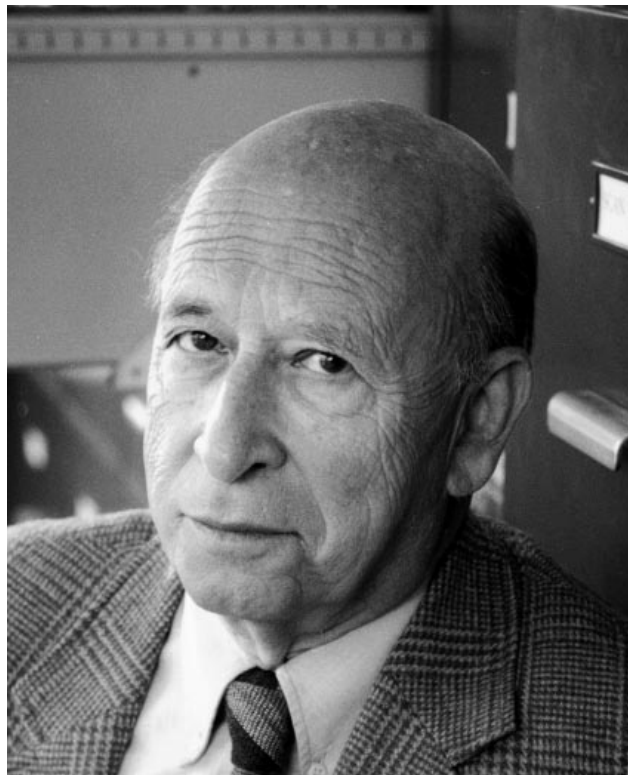
Valentine Telegdi was born on January 11, 1922 in Budapest, into the family of a lawyer. He went to school in Budapest, then continued his education in Vienna.

In his youth he was, as he put it, an “involuntary tourist,” having to leave Austria, then Belgium, then Italy as Hitler was taking them over one by one. In 1943, he finally received permission to come to Switzerland, and in 1944 enrolled at Lausanne University.

Four decades later, Telegdi recalled: “I was a student (1944–1946) in a small engineering school of Lausanne University. I was mostly interested in physical chemistry and so decided to take several courses in physics. It was a happy accident that I chose lectures on theoretical physics read by Ernst Stückelberg. The level of these lectures was definitely beyond my level of understanding; also, I had no idea at the moment how brilliant were Stückelberg’s personal achievements. He was the greatest Swiss physicist after L Euler and was at just that moment working on the concept of the positron as the electron moving back along the time axis. His publications, unknown outside Switzerland, contained much of what made R Feynman famous. It was not for nothing that when Feynman have been receiving his Nobel Prize in Physics 1965, M Gell-Mann sent him a joke cablegram: ‘You can now return my notes. Stückelberg.’”

On Stückelberg’s recommendation, Telegdi was accepted in 1946 as a research fellow to the Institute of Physics of the famous ETH (Higher Technical School) in Zürich, where he became assistant to two brilliant lecturers: Paul Scherrer, an experimentalist, and theorist Wolfgang Pauli. Later on, he characterized the former as a brilliant conductor, and called the latter the “Mozart of physics.” Under Scherrer’s guidance, he carried out an experimental study observing in photoemulsions carbon nucleus disintegration into three alpha particles under irradiation of gamma quanta. However, Telegdi considered his acquaintance and friendship with Mario Verde, the young supervisor of the theoretical part of his thesis, as the greatest blessing in his career.

He was greatly impressed by his contact with Markus Fierz and Viktor Weisskopf. On Weisskopf’s recommendation, Enrico Fermi sent Telegdi an invitation to work with him at the University of Chicago. In 1951, now a married man with a PhD degree, Telegdi arrived in Chicago — the ‘Mecca of physics’ — where he was to live for 25 years. For the first three years he worked under Fermi’s guidance, until Fermi’s death. In 1953, young Gell-Mann began working in Telegdi’s office. Much later a plaque was placed on the wall there: “Murray Gell-Mann discovered strangeness in 1953 working at this desk.” Gell-Mann and Telegdi published a paper on



Valentine Telegdi
(11.01.1922 – 08.04.2006)

the consequences of charge independence of nuclear forces in photonuclear reactions.

At the beginning of 1956 Valentine Telegdi and his student Jerome I. Friedmann (a future Nobel Prize winner) published one of the first three experimental papers that proved P-parity nonconservation in weak interactions. The other two papers reported work done at Columbia University in the laboratories of Wu, Garwin and Lederman. The Friedmann–Telegdi paper was published two weeks later as Telegdi was away in Europe for the funeral of his father. Parity nonconservation was found in their work using photoemulsion, in the decay chain $\pi \rightarrow \mu \rightarrow e$.

In 1958, Telegdi and his co-workers measured the angular asymmetry of electrons in decays of polarized neutrons and found that the ratio of the axial and vector constants in the neutron β -decay was 1.25.

In 1959, Valentine Bargmann, Luis Michel, and Valentine Telegdi published a paper on the theory of spin precession of a particle moving in a uniform electromagnetic field. The BMT theory was the basis for the experiment on measuring the muon’s anomalous magnetic moment, carried out in 1959–1961 by Valentine Telegdi, Richard Garwin, and their co-workers (G Charpak, F J Farley, T Muller, J C Sens, and A Zichichi) at CERN, where Telegdi would come from the USA as a visitor.

In 1967, Telegdi developed, in collaboration with Fierz, general methods for the integration of relativistic equations for spin motion and applications based on them for certain cases of interest for experimenters. Much later (in 1992) Ferrara, Porati, and Telegdi published a paper showing that the gyromagnetic ratio $g = 2$ is the natural value for elementary particles in the tree approximation.

Beginning in the 1950s, Telegdi time and again returned to experimental work on muons. In addition to the above-mentioned experiments, he made precision measurements of muon capture by nuclei, achieved the first precision measurement of muon mass by studying the X-ray emission from μ -atoms, measured hyperfine splitting of muonium by the radiofrequency method, and measured the helicity of the muon neutrino. The results of these experiments were important for the experimental verification of quantum electrodynamics and of the law governing the universal weak (V-A) muon – nucleon interaction.

In his experiments, Telegdi strived for ultimate precision and simplicity by developing radically new techniques. We wish to specially single out the experiment Telegdi and his co-workers did in 1978 to measure the regeneration of K_S^0 mesons on electrons in order to determine the charge radius of the K^0 -meson, as suggested by Ya B Zel'dovich.

In 1976, Valentine Telegdi left Chicago and returned to the ETH in Zürich. Soon he started to work part-time at CERN and later relocated to Geneva. He was elected to the CERN Scientific Policy Committee (SPC) and was its chairman from 1978 to 1983. In this capacity, he succeeded in 1981 in getting Soviet (now Russian) physicists to sit on the CERN SPC.

In the 1980s he started to spend winters working at the California Institute of Technology in Pasadena and later at the University of California, San Diego. He was a close friend of Feynman and Gell-Mann, who worked at CalTech.

Telegdi spoke English, Hungarian, Italian, French, and German fluently and without any accent. In fact, he even spoke such dialects as Viennese and Swiss German. He laughed recalling what Feynman told him once: “It is difficult to imagine what you could achieve in physics if you did not waste time on languages.” When Feynman remarked that the so-called penguin diagrams did not look like penguins, Telegdi countered with: “Come on, Feynman diagrams do not look like Feynman either.”

Telegdi was elected to the National Academies of the USA, Sweden, Hungary, and Russia, and to the Royal Society of London and Academia dei Lincei in Rome. In 1991, he and Moris Goldhaber won the prestigious Wolf Prize.

Russian physicists will always remember the brilliant scientist and human being, Valentine Telegdi.

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