



HAMLET VARTAPETIAN
1927–2013

Hamlet Vartapetian, an outstanding scientist in the field of low and high energy nuclear physics and physics of elementary particles, member of the National Academy of Sciences of Armenia, Doctor of phys.-math. sciences, professor, laureate of the State Prize of the Armenian SSR, Honorary Doctor of JINR (Dubna), passed away on 22 January 2013 in the 86th year of life.

Hamlet Vartapetian was born on 26 May 1927 in Yerevan. In 1930 his family moved to France where H.Vartapetian received higher education graduating from the Ecole Supérieure de Physique et de Chimie Industrielles in Paris in 1952 and the Sorbonne University in 1953.

In the period of German-fascist occupation of France H.Vartapetian together with his parents took part in the Resistance movement in Missak Manouchian's group. After the liberation of France H.Vartapetian became a member and later one of the leaders of the Armenian Youth organisation in France (JAF). In 1948 he joined the Communist Party of France.

The scientific activity of H.Vartapetian started in the world famous Curie's laboratory in the Radium Institute in Paris led by the Nobel Prize laureates, professors Irène and Frédéric Joliot-Curie. While working in France (1952-1958), H.Vartapetian carried out a range of important and relevant studies in the field of nuclear spectroscopy. He carried out detailed investigations of forbidden electromagnetic transitions in strongly deformed nuclei, as well as studied the properties of heavy and weakly deformed nuclei. He proved the influence of the nuclear structure on the value of the coefficient of internal conversion gamma-radiation for a certain class of forbidden gamma transitions. The experimental data obtained by H.Vartapetian in 1952-1961 discovered a new class of forbidden γ -radiation in the spectra of deformed nuclei, that was absent in the well-known theoretical models (Bohr, Mottelson, Nilsson). This led to further experiments and new theoretical concepts. In this period Vartapetian also performed original works by the

method of detecting nuclear radiation; for the first time in the world practice scintillation detectors were used based on NaI(Tl) crystals for spectroscopy of short-lived excited nuclear levels ($10^{-8} - 10^{-10}$ s).

Works on nuclear spectroscopy performed by H.Vartapetian were widely recognised by the scientific community and brought their author fame. They have repeatedly been cited in scientific publications including the fundamental monographs on experimental methods and nuclear physics. The scientific level of the research carried out by H.Vartapetian earned high praise of F. Joliot-Curie who described the author as a scientist “extremely competent in nuclear physics”. In 1958 F. Joliot-Curie nominated H.Vartapetian to participate in experiments at the CERN synchrotron and that was approved by the French Advisory Committee of CERN.

In 1957 H.Vartapetian successfully defended his doctoral thesis and in 1958 together with his family returned to Armenia and started working at the Physics Institute of the Academy of Sciences of the Armenian SSR (since 1962 – Yerevan Physics Institute of the SCAE of the USSR). Since that time the entire scientific and organisational activities of H.Vartapetian have been associated with Yerevan Physics Institute (YerPhi).

In the beginning of the 1960s in the scientific life of Armenia an extremely important event took place which was associated with the decision to build in Yerevan Europe’s largest electron synchrotron for energy of 6 billion electron-volts. The creation of such an accelerator, the launch of which was carried out in 1967, contributed to YerPhi’s research in the field of nuclear physics and elementary particle physics at the level of the world’s leading centres.

Since 1965 all further scientific activity of the physicist-experimenter H.Vartapetian has been associated with the conduct and implementation of experiments at the Yerevan electron synchrotron. Under the leadership of H.Vartapetian a large experimental facility was created equipped with modern hardware and computer technology on which in the 1970s an extensive programme of experiments on photoproduction of mesons on nucleons and nuclei was carried out. The purpose of the experiments was to study the properties of the electromagnetic interaction of hadrons, the mechanism of the interaction of high-energy photons with nuclei, structure of nuclei, elementary particles and resonances.

In the early 1960s the vector dominance model (VDM) predicting the hadron properties of photons was proposed by Gell-Mann and Sakurai. In 1971, at the Cornell symposium on the interaction of electrons and photons at high energies, it was finally confirmed that the VDM could not fully explain the interaction of photons with hadrons. This conclusion was made on the basis of two experimental works on incoherent π -meson production on nuclei performed at the Cornell accelerator and independently at the YerPhi accelerator by a group under the leadership of H.Vartapetian.

This period of H.Vartapetian’s scientific activity includes the experiments on photoproduction of single π и η^0 -mesons on nuclei. Application of methodology based on the development of Glauber theory for processes of incoherent meson production on nuclei, allowed him for the first time in the processes of photoproduction experimentally determine the full cross-section of the interaction of short-lived particles (η^0 -meson) with nucleon. The obtained experimental data on $G_{\eta N}$ for the first time confirmed the theoretical prediction of the quark structure of η -resonance. In the works dedicated to measurements of the neutron distribution in heavy nuclei it was proved the existence of a neutron “fur” in nuclei of lead.

The achievements of physicist-experimenters under the leadership of H.Vartapetian found wide scientific applications in the USSR and abroad. During these years H.Vartapetian often received invitations to make review talks at the most representative international conferences and symposiums on high-energy physics. Recognition of scientific merit of H.Vartapetian was his election in 1968 a corresponding member and in 1977 a full member of the Academy of Sciences of Armenia. In 1980 H.Vartapetian and a number of his colleagues were awarded the State Prize of the Armenian SSR on science and technology for the cycle of works on the photo-production of mesons on nuclei.

From 1973 to 1991, as YerPhI developed a quasi-monochromatic beam of high-energy photons with high level of polarization, a broad programme of polarization studies on the photo-production of mesons on nucleons in the range of nucleon resonance excitation was performed in YerPhI under the leadership of H.Vartapetian. These studies carried out at the Yerevan synchrotron using polarized γ -beam, polarized target and measuring the polarization of nucleon recoil, are unique in measuring the electromagnetic coupling constants of $N^*N\gamma$ resonances and have made a significant contribution in the world bank of data on the observed polarization processes of π^- - and η -meson photoproduction on protons and neutrons.

In 1978 a new effect in the radiation of ultra-relativistic electrons in monocrystals, the so-called radiation in channeling mode, was discovered in experiments led by H.Vartapetian. These works stimulated numerous detailed experimental and theoretical studies in the major centres of the USSR and abroad.

After the collapse of the USSR, under the leadership of H.Vartapetian the last two experiments were implemented at the Yerevan synchrotron.

In 1998 after a 7-year break, one of the most important experiments of the recent period on the photodisintegration of the deuteron by polarized photons was successfully carried out, where for the first time the violation of the hadronic helicity conservation – HHC (the assumption of perturbative QCD) for exclusive photoreactions in scaling mode was shown. Later on in the experiment on the measurement of proton polarization carried out in TJNAF (USA) the hypothesis of HHC was not confirmed likewise.

In 2005 the degree of the polarization (P_γ) of a beam with the energy of $E_\gamma = 1.0$ GeV was measured for the first time on the polarized photon beam of the Yerevan synchrotron by a direct method of using the process of incoherent production of e^+e^- pair in the amorphous target.

The results of these experiments were published in prestigious journals and presented at international conferences in Germany and Sweden.

In recent years the employees of H.Vartapetian have actively been involved in the implementation of a number of major experiments at other accelerators abroad. Particularly fertile scientific collaboration is developing between YerPhI and the European Centre for Nuclear Research (CERN, Geneva) in experiments at the Large Hadron Collider (LHC).

The scientific activity of H.Vartapetian was crucial for the formation and development of experimental elementary particle physics and nuclear physics in Armenia. Today we can say about the scientific school established by academician H.Vartapetian: among his students are 5 doctors and more than 15 candidates of science, most of whom are themselves established scientists, known in scientific community for their works.

H.Vartapetian was successfully combining the fertile scientific work with teaching and scientific-organisational activities. He always paid much attention to the training of young scien-

tists: from 1968 to 2008 he delivered lectures in Physics faculty of Yerevan State University and in 1969–1974 he was the head of the Department of nuclear physics.

In 1974–1993 H.Vartapetian was the deputy director of YerPhI for scientific work and led the experimental physics research implemented at the accelerator in the institute.

In 1992–2008 H.Vartapetian was the Plenipotentiary of the government of the Republic of Armenia in JINR (Dubna) and in 2008 he was awarded an Honorary Doctor of JINR and from 1996 he was also a member of Nuclear Energy Safety Council of the President of the Republic of Armenia. He was the chairman of the Professional Council for awarding scientific degree of Doctor of phys.-math. sciences at YerPhI and was a member of the editorial board of the journal “Proceedings of the Academy of Sciences of Armenia, Physics”. H.Vartapetian is the author of over 160 scientific works.

For his scientific and organisational activities academician H.Vartapetian in 1986 was awarded the Honorary Diploma of the highest category of the Academy of Armenia - “Metsarmangir”. His achievements are marked also by government awards: Order of the Red Banner of Labour, the Badge of Honour and the Medal of Anania Shirakatsi.

Numerous friends, colleagues and students of Hamlet Vartapetian feel the greatest sorrow for the untimely loss of a wonderful person, a distinguished scientist and an organiser of science. In the hearts of all who knew him, who met and worked with him, he left a very bright memory.

R. Martirosyan, V.Haroutiounian, Yu.Chilingaryan, A.Sirunyan