The founder and head of the Chair of Theoretical Physics of the Yerevan State University

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Abstract. The paper is dedicated to the Centenary of an Academician of NAS RA, Professor G.S. Sahakyan’s birth, the Man that founded and headed the Chair of Theoretical Physics (CTP) of the Yerevan State University for almost half a century. The reference to school days of G.S. Sahakyan is made, information about his 7 years long service in the forces in the fields, about the establishment and administration by him of the Chair of Theoretical Physics in the Yerevan State University, about his collaboration with academician V.A. Ambartsumian, about the research associates of the G.S. Sahakyan’s Chair, the students of CTP and the advancement of theoretical physics in Armenia is given. The personality characteristics of G.S. Sahakyan as a principal investigator and leader of CTP are analyzed.

1. The chronological sequence and facts of activities

Sahakyan Gurgen Serob (born on 10.09.1913, in Sarnagbyur Village of Armenian SSR – deceased on 26.03.2000, in Yerevan, the Republic of Armenia), was an Armenian - Soviet theoretician physicist, the founder of gravitation theory and relativistic astrophysics schools in Armenia, that made considerable contribution to the development of theoretical physics and training of young specialists in physics as well as the development of scientific brainpower in Armenia, defended the Thesis of the Candidate of Physical-Mathematical Sciences (1950, Moscow), of the Doctor of Physical-Mathematical Sciences (1963, Moscow), assigned the Professorship (1964, Yerevan), Honored Man of Science of Armenian SSR (1970), a correspondent Member of AS Arm. SSR (1965), an Academician of AS of Arm. SSR (1982), the founder and Head of Theoretical Physic Chair of the Yerevan State University (1951-1985), the Dean of the Physics Faculty of YSU (1967-1972), Manager of the theoretical laboratory associated with the Chair of Theoretical Physics and leading scientist (1989-2000). Mr. Sahakyan participated in the Finnish and the Great Patriotic Wars (1939-1945), was awarded with Orders of Red Star and of the Friendship of Peoples.

At the beginning of 1950 Mr. Sahakyan was the first to introduce the concept of nucleon form factor to the science literature and proposed to determine the structure of this particle by means of investigation of the features of large-angle elastic scattering of ultrarelativistic electrons on the nucleons.

Mr. Sahakyan made weighty contribution to the development of the physics of neutron stars. Along with his followers (under his guidance) he had elaborated the theory of degenerated stellar matter consisting of elementary particles, developed the models of neutron stars consisting of...
degenerated matter. These investigations were based on pioneering works of Mr. Sahakyan conducted in collaboration with Academician V.A. Ambartsumian at the beginning of the sixties of the Twentieth Century [2-4]. In [2-4] the existence of superdense stars consisting of a gas of elementary particles (nucleons, hyperons, resonances, mesons and leptons) was substantiated for the first time, a new effect of the General Relativity (the anomalous defect of mass) was discovered.

The group of scientists headed by Mr. Sahakyan substantiated the possibility of forming a sufficiently dense disk-shaped plasma magnetosphere around the rotating neutron stars and showed that the external boundary of the magnetosphere may emit short-wave cosmic radiation.

Mr. Sahakyan has developed the theory of degenerated plasma at densities of the order, as well as those higher and lower than the nuclear density, in which the contribution of negatively charged pionic component of the nuclear matter is consistently taken into account. He made a substantial contribution to investigations of external manifestations of neutron stars (the pulsars, bursters, clusters of neutron stars and of white dwarfs in compact galactic nuclei) and, in particular, to the solution of the problem of radiation from pulsars. Mr. Sahakyan made essential contribution to the development of relativistic theory with variable gravitational constant.

Mr. Sahakyan is the author of a number of monographs and textbooks [1,5-10], issued in Armenian [7], Russian [1,5-10], English [6], German [5] and French [5] languages. He managed the works of the III (1972) and the VII (1988) Soviet Conferences on the theory of Relativity and Gravitation and of All-Union Symposium (1985) in Yerevan-City, was the member of Scientific-and-Technical Council of the Ministry of Higher and Secondary Education of the USSR. Under his research supervision numerous scientists from Armenia, Ukraine and Czechoslovakia had defended their Candidate and Doctor theses.

The bronze bust of Mr. G.S. Sahakyan set up in the foyer of the central building of YSU symbolizes the outstanding services of the scientist for the development of Science and Education in the leading institute of higher education of the Republic of Armenia.
2. An exceptional destiny

If you can fill the unforgiving minute
With sixty minutes worth of distance run,
Yours is the Earth and everything that’s in it.

R. Kipling

In the month of September, 1913, a boy was born in the village named “Cold Spring”, in the family of Serob Sahakyan that named him Gurgen. Many years since then in the mark of respect in the Russian manner he was referred to as Gurgen Serobovitch (G.S.). At first he studied in the Secondary school and then he attended a Technical Training School to be a builder, and at last also the physical-mathematical faculty of YSU (1934-1939). The destiny of Gurgen was unusual. He served in the forces in the field during 7 years. First he was in action during the Finnish War (1939–1941), then in action all through the World War II (1941–1945). He served in the Army in Belarus, Poland and Austria. The diaries of Mr. Sahakyan with records made in the forces in the field were retained. The records were open up in Leningrad on December 13, 1939 (figure 2) and accomplished in German on December 3, 1945 (figure 3).

![Figure 2](image1.png)

*Figure 2.* The first record in the war diary of Sahakyan G.S. in Leningrad on December 13, 1939.

![Figure 3](image2.png)

*Figure 3.* The last record in the war diary of Sahakyan G.S. made in German on December 3, 1945.

The pages of Mr. G.S. Sahakyan’s diary with notes on physics have been retained. In figure 4 one of these pages is shown with notes on the Special Theory of Relativity. The records were made on March 26, 1943. At that time sub-lieutenant Sahakyan G.S. was a technician of high-performance equipment. The document issued to him after 50 days (figure 5) witnesses that.
The unit commander once could not contain himself any longer and told him with irritation: “Deuce take it! We are here to fight. And every day some of us die, but you are unable to tear yourself away from your physics. Can’t you die without this physics?” Such was G.S. at the battle-front and generally everywhere and always.
Gurgen Sahakyan was an unusual post-graduate student. He was enlisted to the post-graduate student of the Physical Institute after P.N. Lebedev (FIAS USSR) in Moscow. The co-supervisors of his post-graduate studies have been the famous physicists D.I. Blokhintsev (Correspondent Member of AS USSR) and I.E. Tamm (Academician of AS USSR announced later on a Nobel Prize Winner).

G.S. was an exceptional man. In figure 6 a fragment of his records on the theory of radio-frequency emission of pulsars is shown. It is unusual by two reasons. First, on that day the Death unexpectedly intervened in his affairs (please, take notice of the date of entries – March 26, 2000) and interrupted the statement of a research. And, second, on those days G.S. was neither more, nor less than 87 years old. We see that G.S. was faithful to science literally up to the end of his life.

3. An extraordinary scientific leader
G.S. founded the Chair of Theoretical Physics of YSU in 1951 and has headed that during 34 years. In 1985 he resigned the guidance of Chair to his follower Prof. E.V. Chubaryan that is now an Academician of NAS RA. After that G.S. has been the status leader and the principal scientific associate of CTP for long 15 years (up to the end of his life). In 1972 G.S. was 59 years of age, when he issued his basic monograph [6]. It made him world-famous among the scientists involved in research activities in the field of neutron star physics and it was translated into English and was issued abroad in 2 years period, that was very short in those days. In this monograph a systematic statement of the theory of superdense celestial bodies is given for the first time. It is still widely used by physicists engaged in the research of neutron stars and white dwarfs even at present – after 40 years since its publication.

G.S. achieved wondrous collaboration with a distinguished astrophysicist of the XX-th century,- Academician of the Academy of Sciences of USSR, Professor V.A. Ambartsumian.

Photo 7.
Prof. V.A. Ambartsumian,
Academician of AS USSR,
The founder and Director of the Byurakan Astrophysical Observatory (1946-1988),
the President of AS Arm. SSR (1947-1993), a distinguished astrophysicist of the XX-th century.

The collaboration continued for a quarter of century (1959-1985) it being known that V.A and G.S. have jointly published just a few research works (e.g., [2-5]). Though after 1980 there were no joint publications, the collaboration stayed active and fruitful. This collaboration made for the publication of the mentioned monograph [6] by G.S. that was known to world-wide scientific community, firstly, and, secondly, for the organization and conduction in Armenia of two Soviet Conferences on GR and
relativistic gravity in 1972 and 1988, and of All-Union symposium in 1985. G.S. supervised the works of both the conferences and symposium. Owing to the collaboration between V.A. and G.S. the CTP headed by G.S. became the leading institute in the USSR on the theory of superdense celestial bodies and gravitation.

G.S. was an extraordinary leader. He supported and encouraged the gifted (hard-working and giving promise) scientific associates. His opinion was always attentively considered, given credence and trusted. But how he achieved that? Maybe because he was extremely obsessed with the science and endlessly devoted to that? Maybe because he worked almost 15 hours a day? Probably because he was always ready to share his ideas and apprehend the ideas of his colleagues. G.S. was capable of initiating an enthusiasm in associates and that brought its fruits.

4. The followers of G.S.
G.S. was the research supervisor or the adviser of approximately 15 Candidate and Doctor Theses of scientists from Armenia, Ukraine, Czeskoslovakia and other countries. In future they proved to be known scientists in the science community of Armenia. The first followers of G.S. were his associates in the Chair:

1. Prof. Edward V. Chubaryan – Honorable Head of the Academician Gurgen Sahakyan’s Chair of Theoretical Physics of YSU, Academician of NAS RA
2. Prof. David M. Sedrakian - Head of the Chair of YSU: Academician Victor Ambartsumian's Chair of General Physics and Astrophysics, Academician of NAS RA, Vice-President of the Academy of Sciences of Arm. SSR (1990-1994), Editor of the journal “Astrofizika”
3. Prof. Yuri L. Vardanyan - Dean of the Faculty of Radiophysics of YSU, Corresponding Member of NAS RA
4. Prof. Roland M. Avagyan - Dean of the Faculty of Physics of YSU, Corresponding Member of NAS RA
5. Prof. Vladimir Vl. Papoyan, YSU (17.10.1937-06.05.2004)
6. Prof. Gohar G. Arutyunyan - acting Head of the Academician Gurgen Sahakyan’s Chair of Theoretical Physics of YSU
7. Associate Prof. Ashot V. Hovsepyan – YSU.

The last follower of G.S. proved to be
8. Prof. Aram A. Saharian –YSU, Regular Associate, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy.

5. The students of G.S.
G.S. has guided CTP during 34 years (from 1951 to 1985) and was a Dean of the Physics Faculty of YSU in 1967-1972. In that period approximately 3000 students graduated from the Faculty of Physics of YSU, including several hundred theoretical physicists. For the Republic of Armenia these figures were spectacular. Moreover, in 1969-1976 some students from the German Democratic Republic have been taught at the Chair headed by G.S. There were three turn-outs of these students (see photo 8).

These graduates from the Faculty of Physics made weighty contribution to the development of physics in general and especially of theoretical physics in Armenia. Nowadays they successfully work not only in Armenia, but also abroad: Russia, England, Germany, USA, Israel, Italy, Greece, Guinea and other countries.

6. The authority of G.S.
G.S. founded the Chair of Theoretical Physics of YSU in 1951 and has headed that during 34 years. He was a Dean of the Physics Faculty of YSU. He organized and conducted two Soviet Conferences and one All-Union symposium. The CTP headed by G.S. became the leading institute in the USSR on the theory of superdense celestial bodies and gravitation. He was the author of 2 text-books [7,8], 4 monographs and collected articles [1,5,9,10] and of nearly 150 science publications. The activities of
G.S. in different fields: physics of elementary particles, physics of superdense plasma, physics of neutron stars, relativistic gravity, have been invariably fruitful.

Photo 8. The first turn-out of students from Armenia and DDR that were jointly taught at CTP, together with their tutors (1974). From left to right: (the upper row) assistant Samvel Shaginayn, Lutz Schimansky-Geier, Stefan Gottloeber, Karen Aramyan, Roland Kirschner, Ian-Peter Muecket, Roland Schepke, Peter Medler, Tenner Bertram, Araik Sedrakyan, (middle row) Prof. David M. Sedrakyan, Prof. Gurgen S. Sahakyan, Svetlana Harutyunyan, Prof. Edward V. Chubaryan, assistant Karen Shahabasyan, assistant Araik Avetisyan, (lower row) Hrachya Zazyan, Haik Minasyan, Garnik Sargsyan, Gagik Melikyan, Levon Grigoryan, Georgi Savvidy.

G.S. was the only researcher from the Chair of Theoretical Physics that (a) being a post-graduate student he lived in one room with A.D. Sakharov (the world-famous scientist and human rights activist), (b) the research supervisors of which were world-known scientists D.I. Blokhintsev and I.E. Tamm, and that (c) fought on the front during 7 years. G.S. was older than any of his associates in CTP minimum by 20 years.

In photo 9 G.S. is seen in his study room. The free table in the room and a chair beside it were for the associates. During almost 40 years this seat was considered to be the most popular and important place at CTP for all the post-graduate students, all future candidates and even Doctors of Science that many years have been numerous times at this desk for hours of joint research efforts. But that is not the half of it. However early was an associate at this place, G.S. was already working at his desk waiting for him. However late did the associate leave the room, G.S would (most likely to) stay and continue to work.

There was some inscrutability natural to G.S. and he always commanded an esteem to his personality. It is maybe due to these features that his authority was indisputable for all the CTP associates, but maybe because G.S. treated his colleagues, or to be more exact his young colleagues, as
his relatives. He usually addressed the colleagues (the students, post-graduates, young scientists and sometimes not only the young ones) with famous “My deary”.

The students and colleagues of G.S. follow his example.

Photo 9. All associates of CTP remember G.S. Sahaky just as it is seen in this photograph.

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