Profesor Georgi Manev - the Unknown Bulgarian Physicist

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In May 1999 I worked together with my Romanian colleagues from the Astronomical Institute of Romanian Academy in Bucharest on our joint project about the investigation of world astronomical photographic plate archives. The Bucharest Observatory was one of the first observatories, which took part in this programme of the International Astronomical Union, coordinated in Sofia and already we took the first concrete investigations using the valuable Bucharest plate collection.

Figure 1: Professor Georgi Manev – the founder of the Department of Theoretical Physics in Sofia University

The work with my Romanian colleagues always give me a great pleasure because of their correctness and exceptionally friendship. The director of the Astronomical Institute - Dr. Magda Stavinschi has introduced to me the Deputy Director - Dr. Vasile Mioc, who works in the field of Theoretical Astronomy. My topic is not in this region and I looked at this meeting as a common politeness. That is why I was especially surprised when I was told on Saturday that Dr. Mioc came in the institute and now was waiting for me with a request to talk. My surprise increased more when Dr. Mioc told me he has a special interest to the Bulgarian physicist Georgi Manev and showed to me papers on the problem of two bodies, where the term "Manev's field" has been used and quoted by Japanese, American and Romanian scientists. The request of Dr. Mioc was to tell him more about this Bulgarian scientist. The name of Manev did not tell me anything. I understood that Georgi Manev was a scientist from the generation of Professor Nikola Bonev, but my rememberings from the University and the Bulgarian Academy of Sciences did not give me anything. What was my surprise when I heard that in Bucharest they want to organize the NATO colloquium dedicated to the problem of the Manev's field and his application in the modern cosmology. According to Dr. Mioc the new calculations done on the base of the Manev's field potential give the results which fit very well with the results obtained with the relativistic theory.

Figure 2: Prof. G. Manev with his family: the wife Blaga, the daughter Stefana and the son Angel

Through the electronic mail I immediately asked my colleagues in Sofia for information about Georgi Manev. The first information was from the erudite Dr. Sava Manov from the Institute of Nuclear Research and Nuclear Energy. There is an amateur physicist with this name living in the town of Pestera and dumping pseudo discoveries. When I told Dr. Mioc for the alive Georgi Manev I became a witness of numerous telephone conversations of Dr. Mioc and as a result the big wish to make contacts with the supposed Manev. I met Dr. Sava Manov immediately when I was back in Sofia. It became clear that the matter concerns another person - there was Professor Georgi Manev in the 30s in the University. My colleague Konstantin Stavrev even quoted him in his review in 1974 about the Bulgarian authors worked on the cosmological problems. He mentioned that Georgi Manev in the period 1924 - 1932 searching for the resolution of the cosmological problem on the base of the classic mechanics was the first to support the idea of static close Universe and estimated its mass and radius.

I shared with Dr. Alexander Vavrek - scientific secretary of the Bulgarian Academy of Sciences, my discovery of Georgi Manev. Dr. Vavrek knew

Figure 3: Prof. G. Manev as a participant in the Balkan wars

the scientific activity of Professor Manev, but mentioned that in Bulgaria his name always was connected with the defended by Manev ether theory, rejected later by the relativistic theory, that is why Manev was not very popular in the scientific community.

On the way to learn more about Manev I succeeded to find the inheritors of Professor Manev, living in Sofia - his son Dr. Angel Manev, Ivan Davidov and the wife of his grandson Mrs. Teodora Davidova, who, for my great surprise, was a former librarian in the Department of Astronomy of the Faculty of Physics. During the conversation about the activity of Professor Manev I saw as a draft some of his textbooks of Theoretical Physics - the first in Bulgaria. As a matter of fact Professor Manev is the founder of the Department of Theoretical Physics in Sofia University, which he chaired up to 1944. He was for a short time a minister of education in 1938, several times a dean of the Faculty of Physics and Mathematics and a rector of Sofia University. Fundamental questions of physics, which for the time of the 20s were in the focus of the physical investigations, have been treated in the Manev's textbooks. I heard about his correspondence with Einstein, about his participation in the congresses of mathematics in Prague as a representative of Bulgaria, for his membership in the nominative Nobel committee for the highest prize in physics. I was also astonished that Manev was engaged in such fundamental cosmological questions being so many years a teacher in the Gymnasium in the town of Veliko Tarnovo and also took part in the Balkan wars.

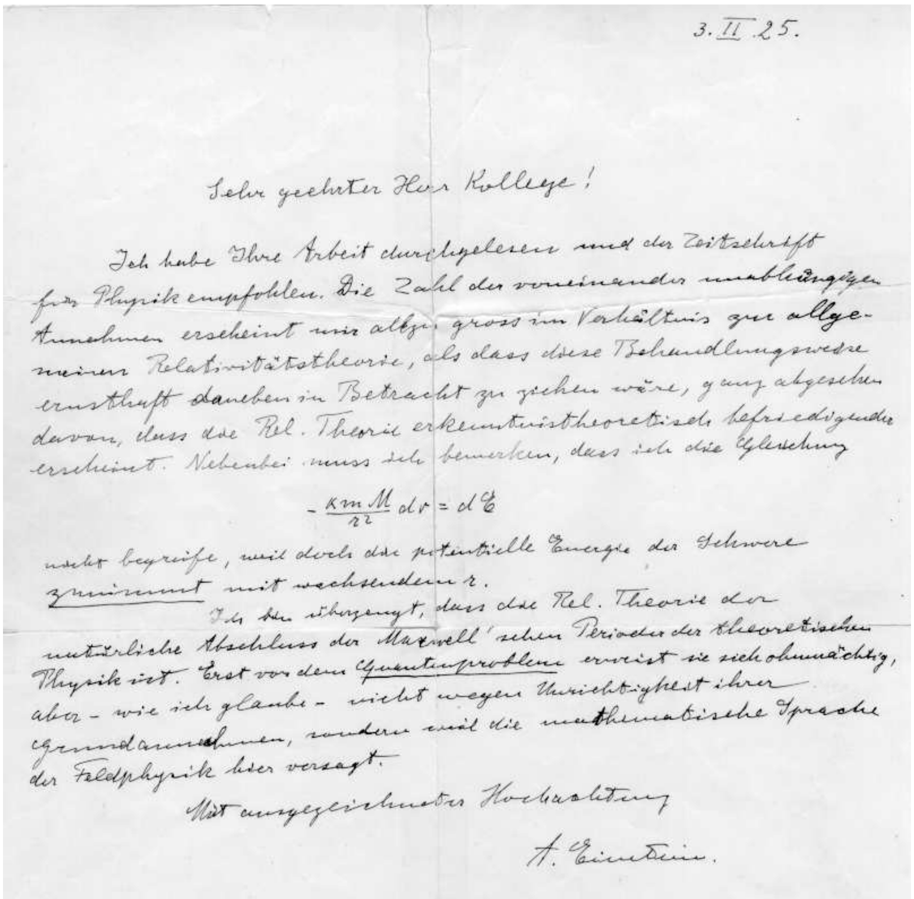
I shared all this with my colleagues in Bucharest and received meanwhile a list of contemporary publications of different scientists working on the topic developed on the base of the Manev's field. From this list was clear that the papers were reported in conferences in Belgrade, Sankt Petersburg, some of

Figure 4: Prof. G. Manev with the participants of the 2nd congress of Mathematics in Prague (1934)

them are published in the prestige American journals on Mathematical Physics.

In the end of 1999 the three biggest European physical organizations: European Centre of Nuclear Researches (CERN), European Space Agency (ESA) and European Southern Observatory (ESO) promoted the initiative Physics on Stage, aiming to arise the place of Physics in the contemporary scientific investigations. In this event Bulgaria was included as a member together with 21 other European counties. The initiative coincided with the Bulgarian hosting of the Fourth Balkan Physics Conference in August 2000 in the town of Veliko Tarnovo. My Romanian colleagues asked me if it is possible to organize a session dedicated to the scientific activity of Manev and the contemporary status and development of his ideas. Honestly saying I also think that such discussion would be better to take place in his motherland Bulgaria and even more - in his native town of Veliko Tarnovo. In this connection Dr. Magda Stavinschi sent a letter which I passed to Professor Matei Mateev. In the frames of Physics on Stage I discussed the matter with the member of the Bulgarian Initiative committee Dr. Plamen Fiziev. He gave me an advice to contact with Mr. Dimitar Hristov - a Bulgarian chemist, who just published a bibliography "Bulgarian Contribution in Mathematics, Physics and Chemistry in the period 1889 - 1939".

Meanwhile in the beginning of August 2000 I received a letter from Professor Florin Diacu - Uvic-Site Director of the Pacific Institute for the Mathematical Sciences of the University of Victoria, Canada. Professor Diacu has the most significant contribution to the investigations on the Manev's field and asked me



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Sehr geehrter Herr Kollege!

Ich habe Ihre Arbeit durchgelesen und der Zeitschrift für Physik empfohlen. Die Zahl der voneinander unabhängigen Annahmen erscheint mir allzu gross im Verhältnis zur allgemeinen Relativitätstheorie, als dass diese Behandlungsweise ernsthaft daneben in Betracht zu ziehen wäre, ganz abgesehen davon, dass die Rel. Theorie erkenntnistheoretisch befriedigender erscheint. Nebenbei muss ich bemerken, dass ich die Gleichung

$$-\frac{kmM}{r^2}\,dr = dE$$

nicht begreife, weil doch die potentielle Energie der Schwere zunimmt mit wachsendem r.

Ich bin überzeugt, dass die Rel. Theorie der natürliche Abschluss der Maxwell'schen Periode der theoretischen Physik ist. Erst vor dem Quantenproblem erweist sie sich ohnmächtig, aber – wie ich glaube – nicht wegen Unrichtigkeit ihrer Grundannahmen, sondern weil die mathematische Sprache der Feldphysik hier versagt.

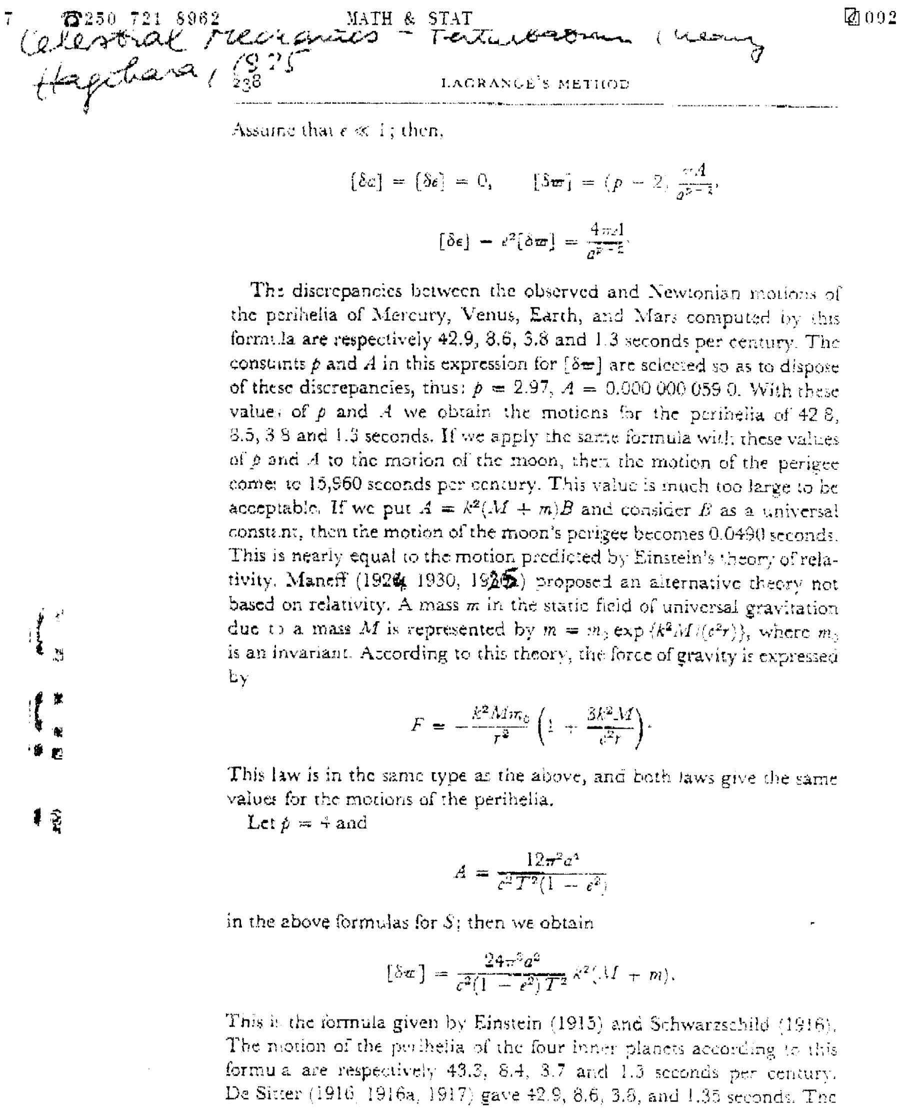
Mit ausgezeichneter Hochachtung

A. Einstein.

Figure 5: Copy from the letter of A. Einstein to G. Manev about the publication of his paper in 1925

to inform him about the initiatives, which will be taken in Bulgaria. He wrote that working in this region 10 years ago he suddenly discovered the Manev's publications. Manev was the first to determine the right coefficients in the equations describing the potential function, known still to Newton. Professor Diacu began to use the term "Manev's Field" in his following work. Diacu mentioned the increasing interest to this topic of the scientists from Europe and America.

After my meeting with Mr. Dimitar Hristov I got a copy of his book, which was published with the support of the Bulgarian Academy of Sciences. In the bibliography (see Table on page 140) it is mentioned that Manev is on the fifth place among the actively working scientists with 20 papers published in the most prestige journals that time as Astronomische Nachrichten, Comptes rendus de l'Academie des Scienties de Paris, Zeitschrift fuer Astrophysik, etc. I was given as a present also a copy of the Year-Book of the Sofia University, phototype issue from 1940 and reprinted in 1988 on occasion of 100 years of Sofia University, where the activities of Professor Manev as a rector, dean and minister of education is mentioned. The Year-Book is quoted also in the published recently book of Tosho Toshev "Ministers of Bulgaria in 1898 - 1998", where one can find a published picture of Manev. I used the possibility offered to me with the business trip of Dr. Katya Tsvetkova in Bucharest to send to Drs. Stavinschi and Mioc a copy of the bibliography of D. Hristov although the book was written in Bulgarian language. They were especially grateful because they found in the book new unknown interesting papers of Manev.



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Celestial mechanics – Perturbation theory

Hagihara, 1975

238 LAGRANGE'S METHOD

Assume that $e \ll 1$; then,

$$[\delta a] = [\delta e] = 0, \qquad [\delta \varpi] = (p-2)\frac{\pi A}{a^{p-2}},$$

$$[\delta \epsilon] - e^2[\delta \varpi] = \frac{4\pi A}{a^{p-2}}.$$

The discrepancies between the observed and Newtonian motions of the perihelia of Mercury, Venus, Earth, and Mars computed by this formula are respectively 42.9, 8.6, 3.8 and 1.3 seconds per century. The constants p and A in this expression for $[\delta\varpi]$ are selected so as to dispose of these discrepancies, thus: $p = 2.97$, $A = 0.000\,000\,059\,0$. With these values of p and A we obtain the motions for the perihelia of 42.8, 8.5, 3.8 and 1.3 seconds. If we apply the same formula with these values of p and A to the motion of the moon, then the motion of the perigee comes to 15,960 seconds per century. This value is much too large to be acceptable. If we put $A = k^2(M+m)B$ and consider B as a universal constant, then the motion of the moon's perigee becomes 0.0490 seconds. This is nearly equal to the motion predicted by Einstein's theory of relativity. Maneff (1924, 1930, 1925) proposed an alternative theory not based on relativity. A mass m in the static field of universal gravitation due to a mass M is represented by $m = m_0 \exp\{k^2M/(c^2r)\}$, where m_0 is an invariant. According to this theory, the force of gravity is expressed by

$$F = -\frac{k^2Mm_0}{r^2}\left(1 + \frac{3k^2M}{c^2r}\right).$$

This law is in the same type as the above, and both laws give the same values for the motions of the perihelia.

Let $p = 4$ and

$$A = \frac{12\pi^2a^4}{c^2T^2(1-e^2)}$$

in the above formulas for S; then we obtain

$$[\delta\varpi] = \frac{24\pi^3a^2}{c^2(1-e^2)T^2}k^2(M+m).$$

This is the formula given by Einstein (1915) and Schwarzschild (1916). The motion of the perihelia of the four inner planets according to this formula are respectively 43.3, 8.4, 3.7 and 1.3 seconds per century. De Sitter (1916, 1916a, 1917) gave 42.9, 8.6, 3.8, and 1.35 seconds. The

Figure 6: Copy from the monograph of Hagihara where he mentioned the contributions of G. Manev and sent as a FAX by Prof. F. Diacu

The following meetings and discussions with Mr. D. Hristov on his studying on the activity of Professor Manev revealed the fact that we are just on the iceberg peak in our attempts to learn more for the Bulgarian scientist, who was strange and undeserved forgotten. In the papers and speeches of Georgi Manev, which I read later on there are a high erudition and deep knowledge of the problems of physics that time. His cosmological ideas put him in the first line of our scientists worked on the problems of cosmology and mathematical physics. My colleagues working exactly in this region have to evaluate the concrete contribution of Professor Manev in this region. Together with this I consider that for all Bulgarian physicists will be interesting to learn more about the scientific activity of Professor Manev - the first significant Bulgarian physicist worked in the beginning of the 20 century which was so full with scientific events and contradictions. In this I see the meaning of this paper too.

The pictures are published with the kind agreement of Angel Manev, Ivan Davidov and Teodora Davidova.