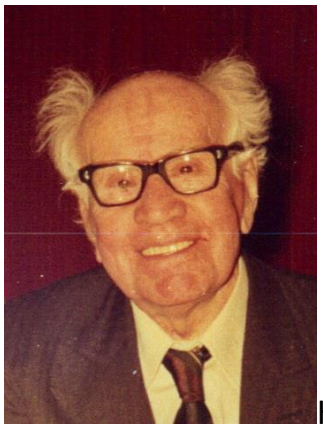
THEODOR V. IONESCU

(8 February 1899 Dorohoi, 6 November 1988, Bucharest)



He was the third child of the eight that reached maturity of Maria and Vasile Ionescu. Vasile Ionescu was a tenant, hiring estates from greater landlords and managing them as agricultural enterprises. When Theodor was very young, Vasile Ionescu and his family moved to the greater town of Botosani. There Theodor (Tudor for the family and friends) attended the Laurian high school being proficient especially in mathematics and sciences. Technical abilities had manifested even as a child. Impressed by the progress in aviation he had cut himself a natural size aeroplane propeller and fixed it on a tree to be run by the wind. Finishing the high school he enlisted to the Faculty of Science of the University of Iasi which he graduated in 1921. Even as a graduate student he was chosen by Professor Petru Bogdan as his assistant preparing the experiments the professor presented to the auditorium. He was given even a small salary that was actually welcomed due to the fact that the financial situation of his father worsened following the WWI and the Bolshevik uptake in nearby Russia.

With the same Prof. Bogdan as supervisor, in 1923 Thedor Ionescu defended his Ph.D thesis on *The Sound Velocity in Liquids*, connecting the velocity of sound and the vaporization heat. The experimental results thus obtained were very accurate and have been used at that time by Richardson and Bell in their treatises of Acoustics.

Following the agrarian reform of 1923, the finances of his family diminished drastically and Theodor Ionescu competed for a fellowship of the Romanian

state to continue his studies in France. There, under Professor Francois Croze's supervision at the University of Nancy he got the second Ph.D. in physics with a thesis treating the quantitative spectroscopy, based on the *last rays.*

Then, for a period, he worked in Sorbonne University in Professor Aime Auguste Cotton's laboratory.

As the University of Iasi opened a competition for professorship tenure, he entered that contest and won it. At only 27 years old, in 1926, by a Higher Royal Decree signed by H.M. King Ferdinand 1st, he was given the title of full professor. He served to the Iasi University until 1940 when he transferred to the University of Bucharest.

In 1935 he married Constanta Chirescu, daughter of a Dobrudgean lawer, from whom he got two sons, Valentin (b. 1937) and Andrei (b. 1944).

At both universities he set up and developed laboratories (both for research and didactics), published student lectures (in the sixties three editions of the Electricity treatise were published), endowed the physics department with a permanent and high capacity continuous current source, also set up mechanics and glass blowing workshops.

Especially when in Iasi, he made friends with university colleagues, both from the science area (Radu Cernatescu – chemist, Grigore Moisil – mathematician, Virgil Ianovici – geologist) and humaties (Petre Andrei – philosopher and sociologist). A long lasting friendship he had with his colleague professors Irina and Constantin Mihul – arrived from Bessarabia – with whom he collaborated in many scientific researches performed there. Actually, the first papers published on plasma physics initiated there.

When in Bucharest, he continued the researches in the field of ionized gases (first with Vasile Mihu, then with the younger assistants and lecturers from the Electricity Department whom he supervised their Ph.D. theses, also with Dr. Octav Gheorghiu at the Bucharest Institute of Physics). They studied systematically the resonant frequencies of molecular oxygen and hydrogen labile negative ions making evident the fact that the molecular energy levels present a Zeeman splitting in the magnetic field of the temporary attached orbiting electron. As a matter of fact, transitions between these Zeeman levels

produce radio short wavelength radiation in the well-known bands of 16, 19, 25, 31, 41, 49 metres. The laboratory researches were associated with the structure of the ionosphere and the idea of considering the ionosphere as an amplifying medium was a forerunner of the later discovered maser, then laser effects. Until then it was considered that the radio waves were reflected on sublayers in ionosphere with different densities – in the so called Van Allen belts. These researches proved that the radio waves are not reflected but amplified by the ionosphere energetically pumped by the solar radiation and also that Van Allen belts do not possess an inner structure.

In the early seventies, together with Dr. Radu Parvan and Ion Baianu, Th. V. Ionescu completed experiments on controlled magnetic resonance oscillations in ultra-hot plasmas. Such seminal experiments discussed the coupling of ionic and electronic oscillations in ultra-hot plasma involving quantum amplified stimulation processes in the presence of longitudinal magnetic fields.

Apart from the fundamental scientific research Prof. Ionescu was also interested in technical applications of physical principles. For instance, in 1925, he invented a microphone based on thermionic currents and a light projector using the interference phenomena.

He built in 1934-1935 a precursor to the high-power, multi-cavity magnetron that was developed subsequently (1937-1940) by Sir John Turton Randall and was used in operating the radar devices, contributing to the British-American air force supremacy in the WWII.

In 1936, he obtained a patent for the 3D imaging in cinema and television and in 1946 together with Prof. Vasile Mihu invented and built a maser-type device (the name maser, also laser, iraser, etc., were coined much later). In that device was obtained, for the first time, the stimulated emission. The device had an oscillating circuit tuned on an eigen-frequency of a negative ion in the plasma that receives energy from it when a voltage modulated with the same frequency is applied during the discharge.

The scientific activity of Prof. Th. Ionescu was performed in the university laboratories in Iasi and Bucharest and also, from 1949 on, at the Institute of Physics in Bucharest.

In 1962-1964 Prof. Ionescu served as Dean to the Faculty of Physics, University of Bucharest.

He was a member of the Romanian Academy of Sciences (1935 – 1948), of the Romanian Academy (correspondent member 1956, full member 1963, president of the physics section 1972).

He was awarded The State Prise (1962).