

MY SCIENTIFIC LIFE.

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I began my contact with Landau being a student of a university at Saratov (USSR). I passed 8 exams of the “Theoretical minimum” and, after official exams, was accepted as a PhD student to Landau’s Department of Theoretical Physics at the Institute for Physical Problems in Moscow, where P.L. Kapitza was the Director. My supervisor was E.M. Lifshitz.

From the very beginning I wanted to work on the theory of superfluidity. My first published paper was devoted to a simple derivation of the Feynman equation for the superfluid ^4He . After I made works on interaction of excitations with a quantized vortex line and on properties of this line near the transition point. I discussed the problem with V.L. Ginzburg, who made similar calculations and we published a joint article. I continue to work on this problem and constructed a system of equation for dynamic of the superfluid near transition point. This paper was a predecessor of future works on dynamic scaling. I also investigated threshold phenomena in the helium spectrum. This permitted to explain a plateau in the spectrum, observed in neutron experiments.

During the same period I worked with Igor Dzyaloshinskii on the problem of generalization of Casimir and Lifshitz results of forces of interaction for the case of bodies separated by an absorbing dielectric. We solved this problem using quantum field theory methods. I consider this problem as the most difficult between my works. The point is, that it was far not obvious that the problem can be solved, that is the forces in such situation can be expressed in terms of observable electromagnetic properties of the bodies.

After defense of my thesis I worked for a short period in a research center near Moscow and soon was invited by Prof. Kapitza back to Institute for Physical Problems to work in plasma physics, which was at this period a field of his interest. I made several articles in plasma physics in collaboration with Alex Gurevich. Particularly I would like to note our work on dissipationless shock waves. Our method was later developed in numerous mathematical papers.

I continued to work on superfluidity and in 1961 solved a problem of structure and oscillations of a vortex line in a dilute Bose gas. To solve this problem I formulated an equation, described a inhomogeneous and time-depending condensate. In the same year a similar paper was published by Eugene Gross and the corresponding theory often is called as Gross-Pitaevskii (GP) theory.

I also invested much time to finish in collaboration with Eugene Lifshitz and Vladimir Berestetskii the Landau-Lifshitz Course of Theoretical Physics.

When conditions for scientific work became intolerable for me, I moved for 4 years in the TECHNION in Haifa, Israil. At the same period I began my fruitful collaboration with Sandro Stringari. In 1995 an important event happened in physics. The Bose-Einstein condensation was achieved in experiments. I began to work on this problem, partially because the conditions were suitable for application of the GP-theory. Several important results were obtained and predictions were made. I will mention only a small number. We investigated structure of a boundary of BEC in a trap. A hidden symmetry of two-dimensional condensate in a trap was revealed. Interference of condensates in momentum space and shift of the transition point in a trap were predicted. Was calculated a shift of frequencies of oscillations due to the non-meanfield corrections etc.

At 1998 I moved to Italy to work at University of Trento. Thus Italy became my second homeland.

I continue to work in BEC and also investigate different systems of interests, for example gases with artificial spin-orbit coupling.

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