

SUDAKOV, V.V.; LANDAU L.D., akademik.

Isotopic-invariant theory of β -decay. Dokl. AN SSSR 90 no.6:1009-1010
Je '53. (MLBA 6:6)

1. Akademiya nauk SSSR (for Landau). (Nuclear physics)

SHEVELEV, Ya.V.; LANDAU, L.D., akademik

Poiseuille's flow in nonsymmetrical radial clearance; analogy with the
torsion of beams. Dokl. AN SSSR 91 no.1:35-38 J1 '53. (MLRA 6:6)

1. Akademiya nauk SSSR (for Landau)

(Fluid mechanics)

LIFSHITS, I.M.; KOSEVICH, A.M.; LANDAU, L.D., akademik.

On the theory of magnetic susceptibility of thin metal layers at low temperatures. Dokl.AN SSSR 91 no.4:795-798 Ag '53. (MIRA 6:8)

1. Akademiya nauk SSSR (for Landau). 2. Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR (for Lifshits and Kosevich). 3. Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (for Lifshits and Kosevich).

(Magnetism) (Metals at low temperatures)

AKHIEZER, A.; ALEKSIN, V.; LANDAU, L.D., akademik.

Magnetization time in weak solutions of He^3 in He^4 . Dokl. Ak. SSSR 92 no.2:259-262 S '53. (MIRA 6:9)

1. Akademiya nauk SSSR (for Landau). 2. Fiziko-tekhnicheskiy institut Akademii nauk Ukrayinskoy SSR, Khar'kov (for Akhiezer and Aleksin).
(Helium--Isotopes) (Magnetism)

BERESTETSKIY, V.B.; LANDAU, L.D., akademik.

Decay into 3π -mesons and the hypothesis of isotopic invariance. Dokl. AN
SSSR 92 no.3:519-521 S '53. (MLBA 6:9)

1. Akademiya nauk SSSR (for Landau).

(Mesons) (Isotopes)

LANDAU, L.

3

USSR 4

537.533.8 : 539.166.835

5696. Limits of applicability of the theory of bremsstrahlung electrons and pair production for high energies. L. LANDAU AND J. POMERANCHUK. Dokl. Akad. Nauk ~~USSR~~ No. 3, 535-6 (1951) in Russian. English translation, U.S. National Sci. Found. NSF. p-136.

When considering radiation processes in a medium, as opposed to those occurring in a single isolated atom, the Bethe-Heitler formulae for bremsstrahlung and pair production are shown not to be valid in the high-energy region. O. FIELD

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LANDAU, L.

B. T. R.
June 1954
Physics

(2) 3

~~8776*~~ Electron-Avalanche Processes at Ultra-High Energies. (Russian.) L. Landau and I. Pomeranchuk. Doklady Akademi Nauk SSSR, v. 92, no. 4, Oct. 1, 1953, p. 735-738.

Investigates rational processes under conditions in which theory developed by Bethe and Heitler, of "braking" radiation of electrons and positrons and of formation of electron-positron pairs by γ -quanta, is incorrect. 2 ref.

[Handwritten signature] 10/16/54

RUDNIK, A.; LANDAU, L.D., akademik.

Capture of μ -mesons by deuterons. Dokl.AN SSSR 92 no.4:739-742 0 '53.
(MLBA 6:9)

1. Akademiya nauk SSSR (for Landau). (Mesons) (Deuterons)

LANDAU, L.D.; LIPSHITS, Ye.M.; ALEKSKYEV, D.M., redaktor; TUMARKINA, N.A.,
tekhnicheskij redaktor

[Mechanics of continuous media] Mekhanika sploshnykh sred. Izd.
2-oe, perer. i dop. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry,
1954. 795 p. (MLBA 10:3)
(Elasticity) (Hydrodynamics)

Landau, L. D.

530.145
 1968 ON THE REMOVAL OF INFINITIES IN QUANTUM ELECTRODYNAMICS L. D. Landau, A. A. Abrikosov and I. M. Khalatnikov Dokl. Akad. Nauk SSSR, Vol. 95, No. 3, 497-500 (1954). In Russian.

The first of several papers on the role of perturbation theory in quantum electrodynamics. This theory uses expansions in powers of e^2 $1/137$, and it is regarded as justifiable only when the coefficient of e^2 is finite and convergent. It is assumed that the theory will ultimately be modified for a distance less than a certain critical value a , and the program is to develop a theory in powers of e^2 , where $e^2 \log a$ is not treated as small. It is shown that the zero-order approximation is equivalent to a "ladder approximation" in which all Feynman diagrams in which two photon lines cross are neglected.

L.S. Goddard

530.145
 1967 AN ASYMPTOTIC EXPRESSION FOR THE GREEN FUNCTION OF AN ELECTRON IN QUANTUM ELECTRODYNAMICS L. D. Landau, A. A. Abrikosov and I. M. Khalatnikov Dokl. Akad. Nauk SSSR, Vol. 95, No. 4, 773-76 (1954). In Russian.

The integral equations of the previous paper (see preceding abstract) are discussed. Explicit solutions are obtained for the electron Green's functions, and it appears that with a suitable choice of gauge the Green's functions are free from divergent renormalization coefficients.

Mathematical Reviews

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LANDAU, L. D.

USSR/Physics - Quant. electrodynamics

Card 1/1

Authors : Landau, L. D., Academician; Abrikosov, A. A., Khalatnikov, I. M.

Title : Asymptotic expression of the Green photon function in quantum electrodynamics.

Periodical : Reports of the Acad. of Scs. of the USSR 95, 6, 1177 - 1180, 21 Apr 1954

Abstract : An asymptotic expression for the Green photon function ($D_{\mu\nu}$) used in quantum electrodynamics is derived. The article contains a diagram.

Institution : Acad. of Scs. of the USSR

Submitted : 25 Feb 1954

LANDAU, L. D.

USSR/Physics

Card 1/1

Authors : Landau, L. D. Academician; Abrikosov, A. A.; and Khalatnikov, I. M.

Title : Electron mass in quantum electrodynamics

Periodical : Dokl. AN SSSR, 96, Ed. 2, 261 - 264, May 1954

Abstract : The problem of electron mass and particularly the problem concerning the role of the electro-magnetic and natural mass of the electron is one of the most interesting problems of quantum electrodynamics. Of basic importance in solving this problem is the characteristic of the Green function of the electron $G(p)$ when $p \rightarrow m$. Equations enabling one to solve such a problem are given. Three references all USSR.

Institution :

Submitted : March 6, 1954

LANDAU, L.D., akademik; KHALATNIKOV, I.M.

Anomalous absorption of sound near to the second-order phase transition.
Dokl. AN SSSR 96 no. 3:469-472 My '54. (MLRA 7:6)
(Low temperature research) (Sound waves)

LANDAU, L. D.

USSR/Physics - Shock waves

Card : 1/1

Authors : Landau, L. D., Academician; and Lifshits, E. M.

Title : Investigation of flow characteristics with the aid of the Euler-Tricomi equation

Periodical : Dokl. AN SSSR, 96, Eri. 4, 725 - 728, June 1954

Abstract : Analysis of an application of the Euler-Tricomi equation to various problems dealing with shock and sound waves. Graphs illustrating the test. One reference. Graphs.

Institution : ...

Submitted : April 13, 1954

LANDAU, Lev Davydevich; SMORODINSKIY, Yakov Abramovich; ALEKSEYEV, D.M.,
redakter; GAVRILOV, S.S., tekhnicheskiy redakter.

[Lectures on the theory of the atomic nucleus] Lektsii po teorii
atomnogo iadra. Moskva, Gos. izd-vo tekhnike-teoret. lit-ry, 1955.
140 p. (Nuclear physics) (MIRA 9:4)

LANDAU, L. D.

On the gradient transformation of the Green function of charged particles. L. D. Landau and I. M. Khalatnikov. *Zhur. Eksp. i Teor. Fiz.* 49, 66-68 (1955).—The problem has been solved of how to do the gradient transformation of the Green function and of the max. for charged particles, which are interacting with an electromagnetic field.
Werner Jacobson

①

Inst. Physical Problems, AS USSR

Landau, L. D.

✓ Hydrodynamic theory of multiple-particle formation.
S. Z. Belen'ki and L. D. Landau. *Uspekhi Fiz. Nauk* 62
55, 309-49 (1955).—Fermi's theory on multiple-particle
formation due to the collision of high-energy particles is
discussed. Such a system is then treated mathematically
on the basis of relativistic hydrodynamics. The total no.
of particles and their angular and energy distribution are
calcd. J. Rivtar Leach

①

LANDAU, L.D.

USSR/Physics - Helium II

Card 1/1 : Pub. 22 - 16/60

Authors : Landau, L. D., Academician; and Lifshits, E. M.

Title : ~~Landau, L. D., Academician; and Lifshits, E. M.~~
About the rotation of liquid helium

Periodical : Dok. AN SSSR 100/4. 669-672, Feb 1, 1955

Abstract : An explanation of the laminar structure of rotating helium II liquid is given from the point of view of the thermodynamic equilibrium theory. Formulas are derived for calculating the thickness of the rotating layers for fast and slow rotations. Four references: 1 British and 3 USSR (1941-1951).

Institution : Acad. of Sci., USSR, The S. V. Vavilov Institute of Physical Problems

Submitted :

LANDAU, L D

Y

Landau, L., and Pomeranchuk, I. On point interaction in quantum electrodynamics. Dokl. Akad. Nauk SSSR (N.S.) 102 (1955), 489-92. (Russian)

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The asymptotic behavior of the particle propagators was investigated in earlier papers (e.g. L. D. Landau, A. A. Abrikosov and I. M. Halatnikov, same Dokl. (N.S.) 96 (1954), 261-264; MR 16, 316), discussing a form of quantum electrodynamics with a cut-off acting to suppress momenta higher than a certain limit Λ . A particular result of the earlier work was the relation

(1)
$$e^2 = e_1^2 [1 + (1/3\pi)e_1^2 \log(\Lambda^2/m^2)]^{-1}$$

①

between the physical charge e and the "bare charge" e_1 . Here ν is the number of distinct charged fields in nature. In this paper it is pointed out that in the limit of a point interaction ($\Lambda \rightarrow \infty$), (1) implies $e^2 = 0$ irrespective of the value of e_1 . This is claimed as a proof that quantum electrodynamics with point interactions is mathematically inconsistent. The paper consists mainly of a discussion of the physical consequences of this conclusion.

Row
1955

F. J. Dyson (Princeton, N. J.).

LANDAU, L. D., MIGDAL, A. B. and GALITEKIY, V. M.

"The Disintegration of the Deuteron by the Coulomb Field of the Nucleus" a paper presented at the International Conference on Nuclear Reactions, Amsterdam, 2-7 July 1956.

D551274

LANDAU, L.D. and POMERANCHUK. I.Y.

Radiation of gamma quanta during the collision of fast
pions and nuclei (II/51)

CERN-Symposium on High Energy Accelerators and Pion
Physics

Geneva 11-23 June 56
In. Branch #5

mw Gradient transformation of the Green function of charged particles. L. D. Landau and I. M. Khalatnikov. *Soviet Phys., JETP* 2, 69-72 (1956) (Engl. translation).—See *C.A.* 49, 15511c. *B. M. R.* 2

LANDAU, L. D.

USSR/Atomic and Molecular Physics - Statistical Physics. Thermo-
dynamics. D-3

Abs Jour : Ref Zhur - Fizika, No 4, 1957, 8973

Author : Landau, L.D.

Inst : Institute of Physical Problems, Academy of Sciences, USSR.

Title : The Theory of a Fermi Liquid

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 6, 1058-1064

Abstract : A theory of a Fermi liquid (FL) is developed, based on the representation of the excitation energy as a functional of the distribution function. In a Fermi gas (FG) with specified (weak) interaction between the atoms at sufficiently low temperatures the "indeterminacy of the momenta," connected with the finite length of the mean free path, is always small compared with the momentum itself, and with the width of the Fermi smearing zone. This serves as the basis for an assumption that as the interaction between the atoms is gradually "turned on," i.e., upon transition from FG to a FL, the classification of the levels remains unchanged. The role of the gas particles in this classification is assumed by the "elementary excitations" ("quasi-particles"), each of which has a definite momentum. They obey the Fermi statistics,

Card : 1/3

USSR/Atomic and Molecular Physics - Statistical Physics . Thermo- dynamics D-3

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 8973

and their number agrees with the number of particles of the liquid. The variation of the energy density of the system δE is determined in the form $\delta E = Sp_{\sigma} \int \xi \delta n d\tau$, where ξ is the energy of the quasi-particle, n the distribution function of the quasi-particles, $d\tau$ the element of phase volume, and Sp_{σ} is the trace over the spin states. Representing the entropy of the FL in a combinatorial manner and using the ordinary supplementary conditions $\delta N = \delta E = 0$, the author obtains the Fermi distribution for the quasi-particles, $n(\xi) = \{ \exp [(\xi - \mu) / \Theta] + 1 \}^{-1}$, in which ξ is a functional of n . At low temperatures the FL still obeys the linear law for the specific heat. It differs from the specific heat of the FG only in replacing the true mass m by an effective mass of the quase-particle $m^* = [p / (\partial \xi / \partial p)]_{p=p_0}$, where p_0 is the limiting momentum of the Fermi distribution of the quasi-particles at absolute zero. The change in ξ , caused by the change in n , is given by the expression $\delta \xi(p) = Sp_{\sigma} \int f(p, p') \delta n' d\tau'$. The function f can be considered as a scattering amplitude of the scattering of the quasi-particle

Card : 2/3

USSR/Atomic and Molecular Physics - Statistical Physics. Thermo- D-3
dynamics.

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 8973

by an angle 0° upon collision with each other, taken with the negative sign. Using the Gallilean relativity principle, a relation is obtained between m and m' . The compressibility of the FL at absolute zero is computed. An expression is obtained for the velocity of sound. The magnetic susceptibility of the FL is found to be $1/\chi = \beta^{-2} \{ 2\pi^2 k^2 / 3\alpha + \bar{\psi}_0 \}$, where β is the magnetic moment of the free particle, α the coefficient in the linear law for specific heat, and $\bar{\psi}_0$ takes into account the exchange interaction. An analysis of the experimental results have shown that $\bar{\psi}_0 < 0$ and amounts to approximately $2/3$ of the first term. Using the kinetic equations, the author obtains expressions for the momentum and energy fluxes.

Card : 3/3

LANDAU, LEV DAVYDOVICH

Landau, Lev Davydovich and Lifshits, Yevgeniy Mikhaylovich 203

Elektrodinamika sploshnykh sred (Electrodynamics of Continuous Media) Moscow, Gostekhizdat, 1957. 532 p. (Their: Teoreticheskaya fizika)

Ed: Rynik, V.I.; Tech. Ed: Murashova, N.Ya.

PURPOSE: This study is intended for advanced students and specialists with an excellent knowledge of mathematical analysis and electrodynamics.

COVERAGE: The present volume of the "Theoretical Physics" series is devoted to the theory of electromagnetic fields in material media and to the theory of macroscopic electric and magnetic properties of matter. The authors consolidate, clarify, and correct the literature existing on these theories. As in the case of their classic Mekhanika sploshnykh sred (Mechanics of Continuous Media) they suggest in their investigation of the phenomena of very diverse fields of science an integrated approach which they think capable of fruitful applications. Personalities mentioned include: Ginzberg, V.L., Professor, who contributed many valuable suggestions and read the manuscript; Dzyaloshinskiy, I.Ye., and Pitayevskiy, L.P., who assisted in proofreading. There are no references.

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AVAILABLE: Library of Congress	

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LADDAY, D.

Oscillations in a liquid	Journal of Experimental Physics	Journal of Experimental Physics
101-108	10 refs.	10 refs.
Physical investigation of waves that can be propagated in a liquid, both at absolute zero and at non-zero temperatures. Absorption of these waves is also considered.	Translation of different types of waves that can be propagated in a liquid, both at absolute zero and at non-zero temperatures. Absorption of these waves is also considered.	Translation of different types of waves that can be propagated in a liquid, both at absolute zero and at non-zero temperatures. Absorption of these waves is also considered.

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LANDAU, L.D., POMERANCHUK, Yu.Ya.

"Radiation of Gamma Quanta During the Collision of Fast Pions and Nuclei," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

LANDAU, L

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~~Conservation laws for weak interactions. L. Landau
 (U.S.S.R. Acad. Sci., Moscow). *Nuclear Phys.* **9**, 127-31
 (1957).—A variant of the theory is proposed in which non-
 conservation of parity can be introduced without assuming
 asymmetry of space with respect to inversion. Some proc-
 esses involving neutrinos are examined on the assumption that
 the neutrino mass is exactly zero. Various possible conse-
 quences of parity nonconservation are considered which per-
 tain to the properties of the neutrino. P. W. Fink~~

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LANDAU, L. D.

Diets: LB3d
Landau, L. D. The theory of a Fermi liquid. Soviet
Physics JETP 3 (1957), 920-925
Consider a Fermi gas at temperatures which are low in
comparison with the temperature of degeneration. The
collision probability for a given atom is proportional to
the square of the temperature. Thus the indeterminacy of
the momenta associated with the finite path length is
small for low temperatures. The basic assumption of
Landau's theory for the construction of spectrum is that
in the gradual transition from the gas to the liquid, the
classification of the levels remains invariant. The role of
particles is assumed by the "elementary excitations",
each possessing a definite momentum and obeying Fermi
statistics. Their number coincides with the number of
particles in a liquid. The energy of a particle depends on
the state of surrounding particles, but the energy of the
whole system is a functional of the distribution function.
These assumptions allow the author to derive expressions
for 1) the energy density of the system taking account of
the fact that the particles possess spin, 2) the entropy,
3) heat capacity, and 4) the effective mass of the quasi-
particles.

1-FW

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London, E. D.

For a liquid which is not in an external field it follows from the principle of Galilean relativity that the momentum arriving at a unit volume must be equal to the density of mass flow. This enables one to find a relation between the real and effective masses. Other formulae, derived by the author, refer to compressibility and magnetic susceptibility of the Fermi liquid, and the momentum and energy flow.

M. Z. Krzywoblocki.

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JK

AUTHOR LANDAU L.D. PA - 3053
TITLE On the conservation Theorems at Weak Interactions.
(O zakonakh sokhraneniya pri slabykh vzaimodeystviyakh.-Russian)
PERIODICAL Atomnaya Energiya 1957, Vol 2, Nr 2, pp 405-406 (USSR)
Received: 5/1957 Reviewed: 7/1957
ABSTRACT First of all the paper under review points out the difficulties which result for modern theoretical physics from the properties of the K- mesons. As a matter of fact, the theoretical physicist faces the following dilemma: either there exist two different kinds of K-mesons, or the conservation theorems are no more valid at the decay of K-mesons.
To assume the existence of two different kinds of K-mesons would mean to contradict the experimental results, and therefore there remains only the possibility that at K-decay the at present assumed conservation theorems are no more valid. As it is impossible to doubt the conservation of momentum, we have here a direct violation of the conservation theorem of parity. One could assume that at weak interactions the conservation theorem of parity and the invariance are not valid in detail with regard to the charge conjugability. But it would be possible that there exists an invariance with regard to the totality of the two operations denoted as combined inversion in the paper under review). At such

CARD 1/2

PA - 3053

On the Conservation Theorems at Weak Interactions.

a combined inversion we have simultaneously a space inversion and a transition of the particles into the corresponding antiparticles. The invariance of all interactions with regard to a combined inversion leaves the total symmetry of the space unchanged. But the electric charges then prove to be asymmetrical. In this case there results for charged particles no conservation theorem of parity, because the operator of the combined inversion does not transmit the charged particles into themselves. Furthermore, the constants which characterize the particles and antiparticles (mass, life span) must be identical. The really neutral particles, i.e. such particles which are identical with their antiparticles, go over into themselves at a combined inversion. For such particles the combined inversion has the character of a normal space inversion, and for such particles the conservation theorem of parity is valid at all interactions.

(No reproductions)

ASSOCIATION: Institute for Problems of Physics, Academy of Sciences of the USSR.

PRESENTED BY: -

SUBMITTED: 11.12. 1956.

AVAILABLE: Library of Congress.

CARD 2/2

LANDAU, L. D.

"Oscillations of a Fermi Fluid," by L. D. Landau, Institute of Physical Problems, Academy of Sciences USSR, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 32, No 1, Jan 57, pp 59-66

"The present article presents an investigation of wave propagation in a Fermi fluid. The development is based on the general theory of such fluids developed by the author (ZhETF, 30, 1058, 1956). The phenomenon must be highly unusual in a Fermi fluid since it is impossible for ordinary hydrodynamic sound waves to propagate in it at absolute zero temperature. This is obvious from the fact that path length and, with it, viscosity of a Fermi fluid tend to infinity as $T \rightarrow 0$. As a result, the coefficient of sound absorption increases without limit.

"It appears, however, that other waves, of a substantially different nature from ordinary sound waves, can be propagated in a Fermi fluid at absolute zero. We shall call such waves 'zero sound' waves...."

Oscillations of a Fermi fluid at absolute zero and at temperatures above absolute zero, absorption of waves, and spin waves are discussed. (U)

54m.1391

AUTHOR LANDAU, L.D., PA - 2715
TITLE On the Possibility for the Polarization Properties of the Neutrino.
(Ob odnoy vozmozhnosti dlya polarisatsionnykh svoystv neytrino ~ Russian)
PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 2,
pp 407-408, (U.S.S.R.)
Received 5/1957 Reviewed 6/1957

ABSTRACT

If we abandon the law of conservation of parity we obtain new properties of the neutrino. The Dirac equation for particles with the mass zero is decomposed into two pairs of equations which are not connected with each other. If we limit ourselves to combined inversion, it is possible to describe the neutrino with just one pair of equations. According to the usual scheme this means that the neutrino is always polarized only in the direction of motion (or in the opposite direction). The antineutrino is always polarized in the corresponding opposite direction. The author of the present paper denotes such a neutrino as longitudinally polarized neutrino or, for short, as longitudinal neutrino. The mass of this longitudinal neutrino automatically equals zero, and this is not changed by any kind of interaction. The concept of the longitudinal neutrino considerably diminishes the number of the possible types of operators for weak interactions. In the paper under review, the author deals with decay of a myon into an electron and two neutrinos. As usual, the interaction operator is represented in the form of a product of operators. The one operator is made up of the ψ -operators of the myon and of the electron, whereas the other operator consists

Card 1/2

On the Possibility for the Polarization Properties of the Neutrino. PA - 2715

of the γ -operators of the two neutrinos. For a longitudinal neutrino only one combination, namely a scalar, can be composed of the two γ -operators. Two combinations can be composed of myon and electron, namely a scalar and a pseudoscalar combination. When the decay of a myon results in a neutrino and an antineutrino, only a four-dimensional vector can be composed from the operators of the longitudinal neutrino and the longitudinal antineutrino. The experiments on the decay of myons do not contradict the concept of the longitudinal neutrino and they show clearly that at the decay of a myon we obtain a neutrino and an antineutrino. Finally the paper under review discusses the influence of longitudinality of the neutrino on the β -decay. (No reproduction).

ASSOCIATION Institute for Physical Problems, Academy of Sciences of the USSR.
PRESENTED BY
SUBMITTED 11.12.1956
AVAILABLE Library of Congress
Card 2/2

AUTHOR: LANDAU, L.D., LIFSHITS, E.M. PA - 2990
TITLE: On Hydrodynamic Fluctuations. (O gidrodinamicheskikh fluktuatsiyakh, Russian)
PERIODICAL: Zhurnal "ksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 3, pp 618-619 (U.S.S.R.)
Received: 6 / 1957 Reviewed: 7 / 1957

ABSTRACT: The general Theory of hydrodynamic fluctuations can be constructed by the introduction of additional "foreign" terms into the equations of motion of the liquid. (Similar to the method used by RYTOV for fluctuations of the electromagnetic field in continuous media by the introduction of corresponding "foreign fields" into the MAXWELL equations).

The introduction of such additional terms can be realized by various equivalent methods. The greatest advantage, however, is offered by such a form in which the fluctuations of the "foreign quantities" in the various points of the liquid are not correlated with each other. This is obtained by the introduction of a "foreign voltage tensor" s_{ik} into the equation by NAVIER-STOKES and of a vector of the "foreign heat current" \vec{g} into the equation of heat transfer. (The continuity equation remains unchanged). The system of hydrodynamic equations then takes the following form:

Card 1/3

On Hydrodynamic Fluctuations.

PA - 2990

$$\partial \rho / \partial t + \operatorname{div}(\rho \vec{v}) = 0, \rho \partial v_1 / \partial t + \rho (\vec{v} \Delta) v_1 = -\partial \rho / \partial x_1 + \partial \sigma'_{ik} / \partial x_k,$$

$$\rho^T ((\partial s / \partial t + \vec{v} \Delta s) - (1/2) \sigma'_{ik} (\partial v_1 / \partial x_k + \partial v_k / \partial x_1) - \operatorname{div} q, \quad q = -\kappa \Delta T + g.$$

$$\sigma'_{ik} = \eta ((\partial v_1 / \partial x_k) + (\partial v_k / \partial x_1) - (2/3) \delta_{ik} \partial v_1 / \partial x_1) + \zeta (\partial v_1 / \partial x_1) \delta_{ik} + s_{ik}$$

The denotations are here the same as those in the authors' well-known textbook. Relations have yet to be added to these equations, which determine the average value of the products of the components s_{ik} and g_i .

The authors do so, at first assuming the fluctuations to be classical and the viscosity and heat conductivity of the liquid as being not dispersing.

For the velocity of the modification of the total entropy S of the liquid the following expression applies

$$S = \int \left\{ \frac{\sigma'_{ik}}{2T} \left(\frac{\partial v_1}{\partial x_k} + \frac{\partial v_k}{\partial x_1} \right) - \frac{q \nabla T}{T^2} \right\} dV$$

The final formulae have the following form:

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On Hydrodynamic Fluctuations

PA - 2990

$$s_{ik}(\vec{r}_1, t_1) s_{lm}(\vec{r}_2, t_2) = 2kT [\eta(\delta_{il}\delta_{km} + \delta_{im}\delta_{kl}) + (\zeta - 2\eta/3)] \delta(\vec{r}_2 - \vec{r}_1) \delta(t_2 - t_1) g_i(\vec{r}_1, t_1) g_k(\vec{r}_2, t_2) = 2kT^2 \delta_{ik} \delta(\vec{r}_2 - \vec{r}_1) \delta(t_2 - t_1),$$

$$g_i(\vec{r}_1, t_1) s_{lm}(\vec{r}_2, t_2) = 0$$

These results can easily be generalized for the case in which a dispersion of the viscosity coefficient or the thermal conductivity coefficient exists or that the fluctuations are quantum-like.

ASSOCIATION: Institute for Physical Problems of the Academy of Science of the U.S.S.R.

PRESENTED BY:

SUBMITTED: 29.11.1956

AVAILABLE: Library of Congress

Card 3/3

LANDAU, L. D., and LIFSHITS, Ye. M.

Quantum Mechanics, Non-Relativistic Theory, Vol. 3, Course of Theoretical Physics, Translated from Russian, by J. B. Sykes and J. S. Bell. 515pp.
Pergamon Press Ltd., England; for US and Canada, Addison Wesley Publ. Co., Inc.
Reading Mass, 1958.

24

PHASE I BOOK EXPLOITATION

SOV/1787

Landau, Lev Davydovich, and Yevgeniy Mikhaylovich Lifshits

Mekhanika (Mechanics) Moscow, Fizmatgiz, 1958. 206 p. (Series: Teoreticheskaya fizika, t. 1) 35,000 copies printed.

Ed.: B.L. Livshits; Tech. Ed.: S.N. Akhlamov.

PURPOSE: This book may be useful to engineers, scientific research workers, and vuz students in the field of mechanics.

COVERAGE: The book is the first volume of the new edition of the authors' Theoretical Physics. The book discusses equations of motion and their integration, impact of particles, vibrations about a position of stable equilibrium, motion of a rigid body, and canonical equations. The succeeding volumes will be: 2) The Theory of the Field, 3) Quantum Mechanics (Nonrelativistic Theory), 4) Relativistic Quantum Theory, 5) Statistical Physics, 6) Hydrodynamics, 7) Elasticity Theory, 8) Electrodynamics of Continuous Media, and 9) Physical Kinetics. The authors thank I.Ye. Dzylshinskiy and L.P. Pitayevskiy. L. Pyatigorskiy is mentioned as having contributed to this field. There are no references.

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Mechanics

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6-24-59

LANDAU, LEV DAVYDOVICH

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Statistical physics, by L. D. Landau and Ye. M. Lifshits
London, Paris, Pergamon Press; Reading, Mass., Addison-Wesley, 1958
484 p. Diagr.
Original Russian title: Statisticheskaya Fizika (Teoreticheskaya Fizika, v.5)

LANDAU, L. D.

"Excitations in Liquid Helium"

paper submitted, but not presented at the Kamerlingh Onnes Conference, Leiden,
Conference on Low Temperature Physics, Leiden, 23-28 Jun 58.

Inst. for Physical Problems, AS USSR

AUTHOR: Landau, L.D., Academician (Moscow) SOV-26-58-10-3/51

TITLE: The Quantum Theory From Max Planck to the Present Day (Teoriya kvant ot Maksa Planka do nashikh dnei)

PERIODICAL: Priroda, 1958, Nr 10, pp 16-21 (USSR)

ABSTRACT: The author describes the development of the quantum theory from Max Planck to Dirac and mentions the contributions made by Feynman, Schwinger and Dyson. By 1954, Soviet theoreticians had found a means of avoiding the application of the perturbation theory - with surprising results. After rigorous calculation, not only are no sensible results obtained but all interactions completely disappear. The intensity of all the interactions, calculated from the theory, invariably come down to zero, thus leaving the theory in a crisis. This tends to throw doubt on the point-interaction concept. Heisenberg has tried in the past few years to preserve the point-interaction concept and to introduce some very fundamental changes into the formal structure of the theory.

1. Perturbation theory---USSR

Card 1/1

SOV/4-58-11-4/31
AUTHORS: Landau, L. D., Academician; and Rumer, Yu. B., Professor
TITLE: Relativity of Time (Otnositel'nost' vremeni)
PERIODICAL: Znaniye - sila, 1958, Nr 11, pp 4 - 6 (USSR)
ABSTRACT: On the basis of theories developed by Galilei, Michelson
and Einstein the authors demonstrate the relativity of move-
ment, time and space. There are 7 drawings.

Card 1/1

LANDAU, L. D.

56-1-56/56

AUTHOR: Landau, L. D.TITLE: The Properties of the Green Function of a Particle in Statistics
(Svoystva grinovskoy funktsii chastits v statistike)PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34,
Nr 1, pp. 262 - 264 (USSR)

ABSTRACT: The present report shows that certain very general relations can be derived for the Green function $G = -i \langle T \psi_1 \psi_2^+ \rangle$ of the particles. In this connection the indices 1 and 2 show that the ψ -operators are taken at the moments t_1 and t_2 . T is the symbol of the chronological product and the averaging takes place over the factual state of the given macroscopic system. Then formulas for the chronological and for the spatial dependence of the matrix elements of the operator ψ are given. The expressions for the Green function are then transformed with the aid of these expressions. Then follows the statistical averaging over the Gibbs distribution. On that occasion the quantity G is expressed as a function of the temperature T and of the chemical potential μ . Then the author goes over from the spatial-chronological representation of the Green function to its Fourier (Fur'ye) components.

Card 1/2

56-1-56/56

The Properties of the Green Function of a Particle in Statistics

The expression for the Green function obtained after some further steps of calculation is explicitly written down. A certain relation exists between the real part and the imaginary part of the Green function. It is here explicitly written down for the case of the Bose statistics and the Fermi statistics and specialized for the case of the temperature zero.

ASSOCIATION: Institute for Physical Problems AN USSR
(Institut fizicheskikh problem Akademii nauk SSSR)

SUBMITTED: November 5, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHOR: Landau, L. D.

SOV/56-35-1-13/59

TITLE: On the Theory of the Fermi Liquid (K teorii Fermi-zhidkosti)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
Vol. 35, Nr 1, pp. 97 - 103 (USSR)

ABSTRACT: In connection with two previous papers by the same author (Refs 1 and 2), which deal with the general theory of the Fermi liquid, the present paper investigates the collision of quasiparticles in a Fermi liquid at scattering angles of 0° . For the investigation of the scattering properties of the quasiparticles, the author proceeds from the variation of the energy of the interacting particles during a modification of their distribution function:

$$\delta \mathcal{E}(p) = \text{Sp}_\sigma f(\vec{p}, \vec{p}') \delta n(\vec{p}') d\mathcal{V}'$$

where $d\mathcal{V} = d^3\vec{p}/(2\pi)^3$ and $\hbar = 1$. The function $f(\vec{p}, \vec{p}')$ dealt with in detail by reference 1 characterizes the scattering amplitude of the quasiparticles in the liquid in collisions of quasiparticles. For the investigation of the multi-

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On the Theory of the Fermi Liquid

SOV/56-35-1-13/59

particle system the author used a method of the quantum field theory based upon the application of Green's (Gin) function G and the "vertex part" Γ . The properties of these two functions and their application to the problem to be investigated are described as follows: In the case that momentum and energy transfer tend towards zero, the scattering amplitude at the collision of quasiparticles will depend essentially upon the boundary value of the ratio between momentum transfer and energy transfer. In conclusion, the question is investigated as to which of these boundary values are connected with the energy of the interacting quasiparticles with respect to the general theory of the Fermi liquid (Refs 1,2). The author finally, expresses his thanks to A.G.Migdal, who drew his attention to the dependence of the scattering amplitude upon the ratio ω/k , as well as to Ye.M.Lifshits and L.P. Gor'kov for their discussion of his paper. There are 3 references, all of which are Soviet.

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On the Theory of the Fermi Liquid

SOV/56-35-1-13/59

ASSOCIATION: Institut fizicheskikh problem AN SSSR (Institute for
Physical Problems, AS USSR)

SUBMITTED: February 5, 1958

Card 3/3

PHASE I BOOK EXPLOITATION

80V/3865

Landau, Lev Davydovich, Academician, and Yuriy Borisovich Rumer, Professor

Chto takoye teoriya otnositel'nosti (What is the Theory of Relativity?)
Moscow, Izd-vo "Sovetskaya Rossiya," 1959. 61 p. 15,000 copies printed.

Ed.: Yu.E. Berenson; Tech. Ed.: N.L. Yusifina.

PURPOSE: This booklet is intended for the general reader interested in the theory of relativity.

COVERAGE: The booklet is a popular presentation of the basic concepts of the theory of relativity and their role in modern physics. Various physical phenomena are explained in terms of the theory of relativity by using examples from everyday experience. No personalities are mentioned. There are no references.

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80V/3865

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LANDAU, LEV DANIDOVICH

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Lectures on Nuclear Theory, by L. D. Landau and Ya. Smorodinsky.
Rev. Ed. New York, Plenum Press, 1959

Vii, 108 p. Illus., Diagr., Tables.
Translated from the Russian:
Lektsii Po Teorii Atomnogo Yadra.

LANDAU, Lev Davidovich

Fluid mechanics, by Lev. D. Landau and E. M. Lifshitz.

London, Pergamon Press, Reading Mass., Addison-Wesley

Pub. Co., 1959.

XII, 536 p. diags., graphs. (Theoretical Physics,
Vol. 6.)

Translated from the original Russian: Mekhanika

sploshnykh sred. Moscow, 1976.

Bibliographical footnotes.

24(5)

SOV/56-37-1-10/64

AUTHOR:

Landau, L. D.

TITLE:

On the Analytical Properties of Vertex Parts in the Quantum Field Theory (Ob analiticheskikh svoystvakh ~~vershimnykh~~ chastei v kvantovoy teorii polya)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 1(7), pp 62-70 (USSR)

ABSTRACT:

Numerous papers have in recent years been written about dispersion relations, which express the analytical properties of the quantities of the quantum field theory. Recently it was found on the basis of such works as those by Karplus, Nambu, Sommerfeld and Wichman (Refs 1-3) that a representation of the distribution and the singularities of the vertex parts is possible in form of a direct diagram representation. The opinion that diagrams are not sufficient is based upon a misunderstanding. The representation of quantum quantities of the field goes beyond the scope of existing theories, and therefore an assumption is made in which neither ψ -operators nor the Hamiltonian are used. The diagram practice is therefore the only possibility when calculating the dispersion relations, and is in no way equivalent to the perturbation

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On the Analytical Properties of Vertex Parts in the Quantum Field Theory

SOV/56-37-1-10/64

theory, because in the latter the quantum particles are considered to be stable, irrespective of the question as to whether they are "simple" or "composed". A generalization of the present diagram techniques must also serve as a basis for future theories. For the detection of singularities the diagrams are analyzed at their ends. When setting up the diagrams it is possible that at every branch-point an unlimited number of lines converge. By the rules actually in force a restriction is, however, imposed: thus, it is not possible for an odd number of pions to intersect at one point. All stable particles with strong interactions may figure as lines. The lengths of the internal lines correspond to the masses. Particular properties occur in the scattering amplitude. The integrals are functions which are connected in the lower and upper half plane by the relation $F(x^*) = F^*(x)$, or, in other words: above and below the axis functions are analyzed which are non-analytical continuations of each other and which have the significance of a discontinuity. In the case of "foreign" half planes the factors a , b may have arbitrary and arbitrarily distributed singularities, which can not be determined at all on the basis of general consideration. (Representation of

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SOV/56-37-1-10/64

On the Analytical Properties of Vertex Parts in the Quantum Field Theory

the scattering amplitude according to Feynman $a(x - i\delta) + b(x - i\delta)$, e.g. the well-known resonance in the scattering of pions by nucleons, which has the property of "foreign" half planes. Such properties may be determined from a theory, which gives an explanation of the scattering amplitude. The author finally thanks L. B. Okun', A. P. Rudik and Ya. A. Smorodinskiy for their valuable remarks. There are 15 figures and 3 references.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR
(Institute of Physical Problems of the Academy of Sciences,
USSR)

SUBMITTED: February 19, 1959 (initially) and April 7, 1959 (after revision)

Card 3/3

24 (0)

AUTHOR:

Landau, L. D.

SOV/53-68-3-10/11

TITLE:

Wolfgang Pauli (Deceased) (Vol'fgang Pauli)

PERIODICAL:

Uspekhi fizicheskikh nauk, 1959, Vol 68, Nr 3, pp 557-559 (USSR)

ABSTRACT:

On the occasion of the death of the famous theoretical physicist and holder of the Nobel Prize, Wolfgang Pauli, at Zürich in December 1958, the Russian Academician L. D. Landau in his necrology discussed the scientific work of the deceased and his great importance for modern physics. A list of the most important publications and books by the deceased is attached. There are 1 figure and 13 references.

Card 1/1

PHASE I BOOK EXPLOITATION SOV/4308

Landau, Lev Davydovich, Academician, and Yevgeniy Mikhaylovich
Lifshits, Professor

Teoriya polya (Field Theory). 3rd ed., rev. Moscow, Fizmatgiz,
1960. 400 p. (Series: Teoreticheskaya fizika, t. 2)
25,000 copies printed.

Ed.: U. Ya. Margulis; Tech. Ed.: S. N. Akhlamov.

PURPOSE: This book is intended for students at schools of
higher technical education.

COVERAGE: The book is the third revised edition of the second
volume in a series on theoretical physics. The series will
consist of the following nine volumes: 1) Mechanics, 2)
Field theory, 3) Quantum mechanics (nonrelativistic theory),
4) Relativistic quantum theory, 5) Statistical physics,
6) Hydrodynamics, 7) Theory of elasticity, 8) Electrodynamics
of continuous media, and 9) Physical kinetics. The present
volume deals with the theory of electromagnetic and gravita-
tional fields. The material is based on the special and
general theories of relativity and the equations are derived

Card ~~1/9~~

LANDAU, Lev Davidovich

Electrodynamics of Continuous Media, by L.D.
Landau and Ye. M. Lifshits. London, New York,
Pergamon Press, Reading, Mass., Addison-Wesley,
1960.

x, 417 p. diags. (Theoretical Physics, V. 8)
Translated from the original Russian: Elektrodi-
namika Sploshnykh Sred, Moscow, 1959.
Bibliographical footnotes.

LANDAU, Lev Davidovich

Mechanics, by L.D. Landau and E.M. Lifshits. New York, Pergamon Press, Reading, Mass., Addison-Wesley, 1960.

165 p. diags (Course of Theoretical Physics, Vol. 1)

LANDAU, Lev Davidovich, akademik; RUMER, Yuriy Borisovich, prof.

Figures which seem to be reassuring. Izobr.i rats. no.1:
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24.4500

AUTHOR: Landau, L. D.

TITLE: Low Binding Energies in the Quantum-field Theory

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 39, No. 6(12), pp. 1856-1857

TEXT: This "Letter to the Editor" shows that in the quantum-field theory there is a relation between coupling constant and binding energy of weakly bound but strongly interacting particles. A spin-zero particle c (e.g., a deuteron) is assumed to disintegrate into the particles a and b ; then $M_c = M_a + M_b - \xi$, where ξ is the binding energy which is assumed to be small. The particle c is supposed to be even with respect to the spin-zero particles a and b (s-state). The total vertex part for the $a + b \rightarrow c$ transition is indicated by g . The mutual scattering amplitude of particles a and b contains a pole-type term which is related to the virtual production of particle c : $(g^2/8\pi)/(M_a + M_b) [(p_a + p_b)^2 - M_c^2]$, or, if

Card 1/2

88470

Low Binding Energies in the Quantum-field Theory

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B006/B063

$(M_a + M_b + E)^2$ is substituted for $(p_a + p_b)^2$ (E - rest energy in the center-of-mass system): $(g^2/16\pi)/(M_a + M_b)^2(E + \epsilon)$ with small E and ϵ . When comparing this expression with that derived for the resonance scattering amplitude, one obtains $g^2/16\pi(M_a + M_b)^2 = \sqrt{2(1/M_a + 1/M_b)\epsilon}$ and, hence, $\epsilon = (g^4/512\pi^2)$.

Also V. Faynberg and Ye. Fradkin obtained a similar relation from the dispersion relations for nucleon scattering. There is 1 Soviet reference.



ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems, Academy of Sciences USSR)

SUBMITTED: October 21, 1960

Card 2/2

LANDAU, L. D.

24

PHASE I BOOK EXPLANATION

SGT/5982

International Conference on High-Energy Physics. 9th, Kiyev, 1959.

Devyataya mezhdunarodnaya konferentsiya po fizike vysokikh energii, Kiyev 15-25 iyulya 1959 g. (Ninth International Conference on High-Energy Physics. Kiyev, July 15-25, 1959), Moscow, 1961. 739 p. 2,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Mezhdunarodnyy Soyuz chistoy i prikladnoy fiziki.

Contributors not mentioned.

PURPOSE: This book is intended for nuclear physicists.

COVERAGE: The collection contains 30 scientific articles presented at the 9th International Conference on High-Energy Physics, held in Kiyev from 15 to 25 July 1959. The articles presented relate mainly to the progress in nuclear physics achieved in 1959. Subjects discussed are the production of

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Fifth International Conference (Cont.)

807/5982

nucleons, their structure, weak and strong interactions, scattering, and their decay. No personalities are mentioned. References accompany individual articles.

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Ninth International Conference (Cont.)

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Theoretical physics. v. 7: Theory of elasticity (Teoreticheskaya fizika, t. 7: Teoriya uprugosti) 3d ed., rev. and enl. Moscow, Izd-vo "Nauka", 1965. 202 p. illus., index. 62,000 copies printed.

TOPIC TAGS: elasticity theory, elastic wave, dislocation, heat conductivity, viscosity

PURPOSE AND COVERAGE: This book is Volume 7 of a series "Theoretical Physics" published by Izd-vo "Nauka". The theory of elasticity is presented as a separate book in this third edition of the above work. The preceding edition (1953) included hydrodynamics and appeared under the title Mekhanika sploshnykh sred; (this book was translated by J. B. Sykes and W. H. Reid of the Pergamon Press under the title Fluid Physics, Addison-Wesley Publishing Company, 1957). The third edition contains a few relatively minor corrections and additions and a new chapter on the microscopic theory of dislocations. As this book is intended primarily for physicists, such

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special problems as complicated mathematical methods for the theory of elasticity, the theory of shells, et cetera, are only briefly discussed. The problems of heat conductivity, viscosity of solids, and theory of elastic vibration and waves are given consideration.

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BAGUZOV, N. P. - Arkhitektor

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Analiz proyektnykh resheniy proizvodstvennykh zdaniy za 1948-1949 gg. Page 65

SO: Collection of Annotations of Scientific Research Work on Construction, completed
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New standard roofing components for industrial buildings. Stroi.
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1. Gosudarstvennyy institut tipovogo proyektirovaniya i tekhnicheskikh
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(Coke ovens)
(Precast concrete construction)

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stroil. 39 no.4:46-48 '61. (MIRA 14:6)

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