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HELVETICA PHYSICA ACTA

Zusammenfassungen der letzten eingegangenen Arbeiten

Résumés des derniers articles reçus

Relaxation des spins nucléaires dans les alliages dilués. II

by B. GIOVANNINI et A. J. HEEGER

Institut de Physique expérimentale, Université de Genève, Genève, Suisse

(29 IX 68)

Résumé. Les résultats obtenus dans une première publication sont établis de manière plus rigoureuse et complétés. Il est montré qu'à l'ordre où nous calculons, l'interaction de Yosida contient toutes les contributions importantes au temps de relaxation des noyaux via les impuretés magnétiques.

Coexistence of Ferromagnetism and Superconductivity?

by R. AVENHAUS, Ø. FISCHER, B. GIOVANNINI and M. PETER

Institut de Physique expérimentale, Université de Genève, Genève, Suisse

(9. XII. 68)

Abstract. Some aspects of the problem of coexistence of superconductivity and ferromagnetism are analyzed, in particular the suggestion of JACCARINO and PETER that it might be possible to compensate an exchange field by an external magnetic field, such making superconductivity possible in a range of very high magnetic fields.

The Meissner effect will however in principle impede very high magnetic fields from penetrating the material. We examine in this paper if there are interactions, acting on the orbits of the electrons, that could play the role of effective magnetic fields, and therefore 'compensate' the Meissner effect. It is shown that, within our assumptions, this is not possible.

Linearisierte Enskog-Gleichung für Boltzonen mit abstossendem Potential endlicher Reichweite

VON K. APPERT

Institut für theoretische Physik der Universität Zürich, Zürich

(16. XII. 68)

Zusammenfassung. Ausgehend von der Kuboformel für einen Transportkoeffizienten werden reduzierte Zeitkorrelationsoperatoren für ein quantenmechanisches Gas mit Boltzmannstatistik eingeführt, die die BBGKY-Hierarchie erfüllen. Mit einer Methode von ERNST wird ein Funktionalansatz $\psi_2\{\psi_1\}$ gefunden, der, in die erste Hierarchiegleichung eingesetzt, die linearisierte Enskoggleichung für Boltzonen ergibt.

An Expression for Relative Strength of Chiral and SU(3) Breaking Interactions

by R. ACHARYA

Institut für theoretische Physik der Universität Bern, Bern (Switzerland)

(17. XII. 68)

Abstract. An explicit expression is derived as a function of π , K , κ , K^* and K_A masses for the parameter $\varepsilon_8/\varepsilon_0$ which measures the strength of SU(3) breaking interaction relative to chiral symmetry breaking. The departure of the numerical value of this parameter from its SU(2) $\otimes$ SU(2) symmetric value is determined and the result is compared with the estimate given by GELL-MANN, OAKES and RENNER.

Fonction de portée effective et déplacement en énergie des états liés en présence d'un potentiel coulombien modifié

par E. LAMBERT

Institut de Physique, Université de Neuchâtel

(27 XII 68)

Abstract. We first recall some properties of the confluent hypergeometric functions then from these we build the usual Coulomb functions paying special attention to their analytical properties. An irregular solution of the Coulomb problem, entire in k^2 , is then built for all l . From this solution an effective range function, meromorphic in k^2 , is established when a finite range additional interaction is present. We simply connect the energy shifts of the bound states, produced by this additional interaction, to the scattering length.

N/D Equations in the Pole Approximation

by G. AUBERSON

Institut de Physique Théorique, Université de Lausanne (Switzerland)

(30. I. 69)

Summary. One-channel N/D equations are considered. We propose a method allowing the construction of a convergent sequence of pole approximations for the left-hand cut. Then, the convergence of the corresponding sequence of approximate amplitudes is proved under specific conditions. This convergence holds especially in the physical region. Finally, the physical meaning of some abnormal cases is discussed.

N/D Equations with Marginally Singular Kernels

by G. AUBERSON

Institut de Physique Théorique, Université de Lausanne (Switzerland)

(30. I. 69)

Summary. The singular N/D equations which arise in the case of partial-wave dispersion relations with an asymptotically constant left-hand discontinuity $\phi(z)$ are investigated. It is proved that the resolvent (considered as an analytic function of the 'coupling constant' $\lambda = \lim_{z \rightarrow -\infty} \phi(z)$) has a non polar singularity in the λ -plane. The location of the singular point is controlled by the rate of inelasticity at infinite energy. This singularity gives rise to a multiplicity of solutions.

Polarisation der 4f-Schale von Eu durch Stösse mit optisch gepumptem Cs

von R. TILGNER, J. FRICKE und J. HAAS

Physikdepartment der Technischen Hochschule München

(29. I. 69)

Abstract. An experiment is described in which the $^8\text{S}_{7/2}$ ground state of Eu was polarized by collisions with optically pumped Cs. The rf induces transitions between the Zeeman sublevels of Eu were detected as a change in the Cs pumping light transmission.

Causality in S-Matrix Theory. II

by COLSTON CHANDLER

Seminar für Theoretische Physik der ETH Zürich

(3. II. 69)

Abstract. Two scattering processes are discussed for which there exist points in the physical region of the mass shell at which the analytic S -matrix cannot be represented as the boundary value of a single analytic function. At such points the S -matrix must instead be represented as a sum of at least two such boundary value terms.

Der zweifach verbotene Beta-Übergang von ^{137}Cs

VON H. SCHNEUWLY, L. SCHELLENBERG, O. HUBER UND W. LINDT

Physikalisches Institut der Universität Fribourg

(5. II. 69)

Abstract. The spectrum of the twice parity-forbidden β -transition of ^{137}Cs was measured with two spectrometers of different types. The experimental shape factor was fitted with the one-parametric formula $S \propto q^2 + \lambda^2 p^2$ and the two-parametric ξ -approximation of the theoretical shape factor. With the hypothesis of CVC theory the ratio of nuclear matrix elements $\int^i T_{ij} / \int R_{ij}$ is deduced.

On the Ratio of Wave Function Renormalization Constants of π and K Mesons

by R. ACHARYA

Institut für theoretische Physik der Universität Bern, Bern (Switzerland)

(26. II. 69)

Abstract. The validity of Khuri's conjecture on the ratio of the wave function renormalization constants of π and K mesons is investigated within the framework of asymptotic $\text{SU}(3)$ symmetry. It is shown that the result holds only if certain strong asymptotic conditions are satisfied. These asymptotic requirements also lead to the degeneracy of A_1 and K_A masses under the pole dominance hypothesis for spin one spectral functions.

Investigation on Colour Centres in Alkaline Earth Fluorides

by H. BILL

Institut de Physique Experimentale, Université de Genève

(20. III. 59)

Abstract. Two new colour centres in alkaline earth fluorides are investigated in this article. Both are due to the impurities oxygen and yttrium and they are only observed with EPR after the crystals have been X rayed. In fact the X rays change the valence state of the impurity complexes formed during growth or by hydrolysing the appropriately doped crystals thus creating the paramagnetic centres. One of them consists of a (YO_2) molecule substitutionally located in the crystal. The other centre involves one O^- ion in substitutional position nearby a Y^{3+} ion. Their model and the informations about their electronic structure have been deduced from EPR, ENDOR, optical measurements, annealing experiments and in the case of the (YO_2) also by investigating the centre produced with water enriched in ^{17}O . The results are described by the appropriate spin Hamiltonians. The centre (YO_2) is shown to form approximately a $(\text{Y}^{3+} + \text{O}_2^{3-})$ structure. The other centre has its magnetic electron located predominantly in a p_z orbital of the O^- ion involved. The thermal annealing experiments performed on samples containing both centres and Y^{3+} ions exhibit after appropriate treatment of the samples charge transfert from the less stable centre involving one O^- ion to the $(\text{YO}_2)^-$ molecule ion (transfert of holes). The annealing experiments further show that the optical transition observed at $486 \text{ m}\mu$ in CaF_2 and at $510 \text{ m}\mu$ in SrF_2 arises from the (YO_2) centre.