

# Zusammenfassungen der letzten eingegangenen Arbeiten = Résumés des derniers articles reçus

Objektyp: **Group**

Zeitschrift: **Helvetica Physica Acta**

Band (Jahr): **45 (1972)**

Heft 4

PDF erstellt am: **21.07.2024**

## **Nutzungsbedingungen**

Die ETH-Bibliothek ist Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Inhalten der Zeitschriften. Die Rechte liegen in der Regel bei den Herausgebern.

Die auf der Plattform e-periodica veröffentlichten Dokumente stehen für nicht-kommerzielle Zwecke in Lehre und Forschung sowie für die private Nutzung frei zur Verfügung. Einzelne Dateien oder Ausdrucke aus diesem Angebot können zusammen mit diesen Nutzungsbedingungen und den korrekten Herkunftsbezeichnungen weitergegeben werden.

Das Veröffentlichen von Bildern in Print- und Online-Publikationen ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. Die systematische Speicherung von Teilen des elektronischen Angebots auf anderen Servern bedarf ebenfalls des schriftlichen Einverständnisses der Rechteinhaber.

## **Haftungsausschluss**

Alle Angaben erfolgen ohne Gewähr für Vollständigkeit oder Richtigkeit. Es wird keine Haftung übernommen für Schäden durch die Verwendung von Informationen aus diesem Online-Angebot oder durch das Fehlen von Informationen. Dies gilt auch für Inhalte Dritter, die über dieses Angebot zugänglich sind.

**HELVETICA PHYSICA ACTA**  
 Zusammenfassungen der letzten eingegangenen Arbeiten  
 Résumés des derniers articles reçus

---

**Statistical Description of Elementary Processes**

**II. Quantum Field Theory**

by L. P. HORWITZ

University of Geneva

(14. II. 72)

*Abstract.* In a preceding paper, the consequences of the assumption that the measurements set up to characterize the quantum state of certain systems do not form (non-trivially) a complete set was investigated in the framework of the one-particle Hilbert space. In this paper, systems of identical particles, and the structure of the associated quantum fields, are discussed. The general form of the  $n$ -body density matrices characterizing incompletely measured states is given, and a special class of observables which 'carry their own incoherence' is constructed. As an illustration, a free charged Klein-Gordon field is constructed; it is shown that the field is non-local if the energy momentum is a non-trivial function of unmeasured variables. Coherent states are discussed, and it is shown that fields with some similarity to those of the Veneziano operator theory appear as a special case in which the spectrum of unmeasured observables corresponds to the four-fold tensor indices of space-time.

**On a Recent Paper of Amrein, Georgescu and Jauch**

by COLSTON CHANDLER

Department of Physics and Astronomy, University of New Mexico,  
 Albuquerque, New Mexico 87106, USA

and

A. G. GIBSON

Department of Mathematics and Statistics, University of New Mexico,  
 Albuquerque, New Mexico 87106, USA

(14. II. 72)

*Abstract.* Condition ( $D$ ) of a recent paper of Amrein, Georgescu and Jauch is shown to be a consequence of their conditions ( $\theta$ ) and ( $A$ ).

**A Note on the Alpha-Decay Half-Lives of Heavy and Superheavy Elements**

by M. D. HIGH and R. MALMIN

Department of Physics, Indiana University, Bloomington, Indiana 47401

and

F. B. MALIK

Institut de Physique, Université Neuchâtel, Switzerland

(17. II. 72)

*Abstract.* The known alpha-decay half-lives of transuranium elements can be reproduced using an interaction potential having a repulsive core. Results are insensitive to the magnitude of the core height but the derived nuclear half-density radius  $= 1.1A^{1/3}$  F. is consistent with those obtained from the analysis of mu-mesic and electron scattering experiments. Using this model and theoretical  $Q$ -values from Green's mass formula, the upper limits of alpha-decay half-lives of  $(112)^{292,294,296,298,300}$ ,  $(114)^{294,296,298,300,302}$ , and  $(126)^{310,312,314,316,318}$  are computed. For isotopes of elements 112, our calculations barely overlap with those of Nilsson et al. For isotopes of element 114, our estimated half-lives are considerably shorter than those of Nilsson et al. but agree with those of Grumann et al. For isotopes of 126, our calculated half-lives are longer than those estimated by Muzychka.

## On the Uniqueness of the Energy Density in the Infinite Volume Limit for Quantum Field Models

by K. OSTERWALDER and R. SCHRADER

Lyman Laboratory of Physics, Harvard University, Cambridge, Mass. 02138, USA

(25. II. 72)

*Abstract.* We isolate two properties of the vacuum energy  $E_V$  (for volume  $V$ ) that are sufficient to ensure the existence and uniqueness of  $\lim_{V \rightarrow \infty} E_V/V$ . The first property has been recently verified by Glimm and Jaffe for the  $P(\varphi)_2$  quantum field model. The second property is shown to hold in a simplified  $P(\varphi)_2$  model where the free field energy  $H_0$  is replaced by the number operator  $N$ .

## Coherence Resonances in the Alignment-Orientation Coupling Process Induced by an Electric Field

by A. FAIST

Laboratoire d'optique physique, EPF, Lausanne

(6. III. 72)

*Summary.* The alignment-orientation coupling process is studied in the case of atomic excited states in the presence of an electric field. The basic properties are obtained by applying a static electric field. The phenomenon is more complex in the case of an oscillating electric field and new resonances of the coherence type appear. The general properties of these new resonances are studied with the aid of computational methods.

## The Chemical Energy Shift of K X-rays

by K. ALDER, G. BAUR and U. RAFF

Institute of Theoretical Physics, University of Basel, Switzerland

(8. III. 72)

*Abstract.* The chemical energy shift of K X-rays is investigated by means of free ion configurations. The influence of the  $l$ -quantum number of the valence electron on  $\delta K\alpha$  and  $\delta K\beta$  is discussed. A method based on free ion calculations is given for the determination of the ionicity and for the change in total electron density  $\delta|\psi(0)|^2$  between two chemical compounds.

## Calculation of Internal Conversion Coefficients for all Atomic Shells

by K. ALDER, U. RAFF and G. BAUR

Institute of Theoretical Physics, University of Basel, Switzerland

(8. III. 72)

*Abstract.* Today extensive calculations of internal conversion coefficients (ICC), including screening and finite nuclear size effects, are available for the K, L, M and  $N_1$  through  $N_5$  atomic shells. In the present paper conversion coefficients for all atomic shells and various nuclear charge numbers,  $Z$ , are calculated with Hartree-Fock-Slater bound state wave functions and compared to approximate calculations and to experimental results. The knowledge of theoretical outer shell conversion coefficients offers the possibility of evaluating the change in total electron density  $\Delta|\psi(0)|^2$  at the nucleus for isotopes decaying in two different chemical compounds.