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HELVETICA PHYSICA ACTA

Zusammenfassungen der letzten eingegangenen Arbeiten
Résumés des derniers articles reçus

Scattering of 14.1 MeV Neutrons by ^{10}B

by B. VAUCHER, J. C. ALDER and C. JOSEPH
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(10. XII. 69)

Abstract. The angular distributions of the differential cross-sections for scattering of 14.1 MeV neutrons to the $Q = 0$, -1.74, -2.15, -3.58, -4.77, $(5.11+5.16+5.18)$, $-(5.92+6.04+6.13)$, -6.56 and $-(6.88+7.0)$ MeV levels of ^{10}B have been measured for $11° \leqslant \theta_{CM} \leqslant 164°$. They were deduced from the time-of-flight spectra of neutrons scattered by two targets of different ^{10}B and ^{11}B isotopic concentrations, with the help of a Monte-Carlo program which reproduced the measured spectra. Owing to the small values of the measured cross-sections, a precise determination of parasitic events was necessary.

The elastic scattering has been analysed by the optical model. A coherent description of the inelastic scattering to the 2.15, 3.58, 5.16 and 6.56 MeV has been achieved with the collective DWBA model. The not yet well-defined parity of the $Q = -6.56$ MeV level appears to be negative.

Charge-Exchange Collisions between Hydrogen Ions and Alkali Vapour in the Energy Range of 1 to 20 keV

by W. GRÜEBLER, P. A. SCHMELZBACH, V. KÖNIG and P. MARMIER
Laboratorium für Kernphysik, Eidg. Technische Hochschule, Zürich

(15. XII. 69)

Summary. Charge-exchange collisions have been studied for H^+ and D^+ ions incident on the alkali-vapours Cs, K, Na and Li. Measurements of the positive and negative beam components after passage through the target were made in the energy range of 1 to 20 keV. Also the one- and two-electron charge exchange cross section σ_{10} and σ_{1-1} were determined in this energy range. The value of the maximum of the negative beam component decreases monotonically from approximately 20% of the incident beam intensity at about 1 keV for Cs to 6% at 4 keV for Li. The maxima of Cs and K are quire sharp, whereas the maxima of Na and Li show a much broader behaviour, such that, for these latter elements, the yield at 10 keV is higher by a factor 2 to 5. The maximum of the cross section σ_{10} for all the elements measured is approximately 10^{-14} cm^2. The cross section σ_{1-1} has the maximum value of $8 \cdot 10^{-17}$ cm^2 for Li, $5 \cdot 10^{-16}$ cm^2 for Na, $6 \cdot 10^{-17}$ cm^2 for K and $6 \cdot 10^{-17}$ cm^2 for Cs. An analysis of the results shows that the adiabatic parameter postulated by Massay is dependent on the nature of the colliding particles.

On the Decay of ^{140}Ba to ^{140}La

by JEAN KERN and GABRIEL MAURON
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(18. XII. 69)

Abstract. To complement results obtained by (d, p) and (n, γ) reaction spectroscopy on the structure of ^{140}La, some details of the decay of ^{140}Ba have been investigated using a Ge(Li) detector. Several γ-ray energies and intensities have been determined with improved accuracy. In addition, upper limits have been obtained for transitions which are important to the test of the nuclear model describing ^{140}La.

D(*d*, *p*)T-Reaktion mit polarisierten Deuteronen unterhalb 500 keV

von K. Jeltsch, P. Huber, A. Janett und H. R. Striebel
Physikalisches Institut der Universität Basel

(23. XII. 69)

Summary. The angular distributions of the D(*d*, *p*)T-reaction at E_d = 150, 230 and 340 keV mean energy have been measured with polarized incident deuterons. From these data the four independent components of the polarization efficiency D_1, D_{33}, D_{11}–D_{22} and D_{13} are calculated and fitted as functions of the emission angle by the adequate associated Legendre functions. The energy-dependence of the expansion coefficients is discussed, and it is shown that only below 300 keV the coefficients, except those due to quintet contributions, agree with theoretical predictions of Rook and Goldfarb.

The ratio of vector- and tensor-polarization in dependence of the probabilities of high-frequency-transitions are investigated.

Space-Time Symmetry of Transverse Electromagnetic Plane Waves

by Aloysio Janner
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and Edgar Ascher
Battelle Institute, Advanced Studies Center, Carouge-Geneva, Switzerland

(23. XII. 69)

Synopsis. A way of determining the relativistic symmetry group of an electromagnetic field tensor that admits a Fourier expansion is summarized in a set of rules where the concepts of spectrum and of spectral group are introduced.

This approach is applied to the case of linearly, circularly and elliptically polarized transverse electromagnetic (TEM) waves. The group of the symmetry translations (called primitive translations), the point group and a set of associated non-primitive translations are explicitly given in each of the above three cases. From these groups one easily derives the symmetry group in space and time of a TEM wave, which is a non-symmorphic subgroup of the Poincaré group, i.e. a non-split extension of the group of primitive translations by the point group. The limit of infinite wave length is discussed and the results are shown to be consistent with previous one relative to the symmetry of uniform electromagnetic fields.

Résonance paramagnétique du manganese dans SrFCl

par D. Cevey et R. Lacroix
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(6 I 70)

Résumé. La résonance paramagnétique électronique de l'ion Mn^{2+} incorporé comme impureté dans un monocristal de SrFCl a été étudiée. Les constantes de l'hamiltonien de spin ont été déterminées, y compris les constantes de structure superhyperfine des ions fluor voisins.

A Rigorously Solvable Model of a Magnetic Ion in a Superconductor

by J. Bernasconi and S. Strässler
Brown Boveri Research Center, Baden, Switzerland

(17. I. 70)

Abstract. A magnetic ion, described by the Anderson Hamiltonian is coupled to a strong coupling superconductor (kinetic energy is neglected). Exact conditions for the magnetic state are derived.