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HELVETICA PHYSICA ACTA

Zusammenfassungen der letzten eingegangenen Arbeiten
Résumés des derniers articles reçus

Expansion of Gaussian Functions in Hydrogen Eigenfunctions

by V. DOSE

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(4. IV. 74)

Abstract. Methods have been developed which allow the expansion of Gaussian functions $r^j Y_l^m(\vartheta, \varphi) \cdot \exp(-\alpha r^2)$ in discrete and continuous eigenfunctions of the hydrogen atom. Different approaches are presented for application in different regions of an $\alpha-k$ and $\alpha-n$ plane respectively where k is the electron momentum in a continuous state and n is the principal quantum number of a discrete state. Detailed numerical results have been obtained for the special case $l=j=0$ and exponent parameters α in the range $10^{-5} \leq \alpha \leq 10^2$. An overall check of the accuracy of the results is possible with the help of the closure relation which is in all cases satisfied to better than 10^{-5} , demonstrating the satisfactory reliability of the proposed methods.

Charge Transfer in Transition Metal Alloys—A Soft X-Ray Study

by A. WENGER and S. STEINEMANN

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(25. IV. 74)

Abstract. A method is described for the direct determination of the changes on alloying of the number of $3d$ electrons on transition metal atoms. It is based on the measurement of ratios of relative integrated X-ray line intensities and on a phenomenological relation between the changes of $3d$ charge density inside the transition element ion and the change of the number of electrons in the d -band.

About fifty alloys of the binary systems of a transition metal (Ti, V, Cr, Mn, Fe, Co, Ni, Cu) with Al and Ni–Cu have been measured. Measurements concerning the $3p$ electrons of Al are also presented. In many cases, the results thus obtained can decide between two or more models for the electronic structure of these alloys as found in the literature. For Cu–Ni alloys no change for the number of d electrons on nickel atoms is found, in agreement with the minimum polarity model of Lang and Ehrenreich.

The Maximal 'Kinematical' Invariance Group for an Arbitrary Potential

by CHARLES P. BOYER

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(9. V. 74)

Abstract. We consider the problem of finding all local symmetries of the time-dependent Schrödinger equation in n spatial dimensions with an arbitrary time-independent potential. This problem is reduced to the solution of a set of first-order partial differential equations for the potential. The general solution and a complete list of such potentials and their symmetry groups are then given for the cases $n = 1, 2, 3$. We give also in these cases the explicit forms for the infinitesimal generators and a discussion of the corresponding group representations.