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FUTURE PUBLICATIONS

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Limits on the Angle of $Z-Z'$ Mixing from Data Obtained by Measuring the Process $e^+e^- \to W^+W^-$ at the LEP2 Collider

V. V. Andreev and A. A. Pankov

An analysis of effects induced by new neutral gauge Z' bosons was performed on the basis of data from the OPAL, DELPHI, ALEPH, and L3 experiments devoted to measuring differential cross sections for the process of the annihilation production of pairs of charged gauge $W^{\pm}$ bosons at the LEP2 collider. By using these experimental data, limits on the Z'-boson mass and on the angle of $Z-Z'$ mixing were obtained for a number of extended gauge models.

Cold Nuclear Synthesis

E. N. Tsyganov

Recent accelerator experiments devoted to the synthesis of various elements revealed that effective cross sections for respective reactions depend on the material in which target nuclei are situated. In those experiments, a significant increase in the probability of interaction was observed in those cases where target nuclei were implanted into or were part of a conducting crystal. In the opinion of the present author, the experiments in question provide a fresh look at the problem of so-called cold nuclear synthesis.

Analytic and "Frozen" Coupling Constants in QCD up to NNLO from DIS Data

A. V. Kotikov, V. G. Krivokhizhin, and B. G. Shaikhatdenov

Deep-inelastic-scattering data on the F_2 structure function provided by the BCDMS, SLAC, and NMC Collaborations are analyzed in the nonsinglet approximation with the analytic and "frozen" modifications of the strong coupling constant featuring no unphysical singularity (Landau pole). Improvement of agreement between theory and experiment, with respect to the case of the standard perturbative definition of α_s considered recently, is observed, and the higher twist terms are shown to reduce accuracy in the next-to-next-to-leading order, thus confirming earlier studies.

Isotopic Dependence of the Nuclear Charge Radii and Binding Energies in the Relativistic Hartree–Fock Formalism

R. Niembro, S. Marcos, M. L'opez-Quelle, and L. N. Savushkin

Relativistic nonlinear models based on the Hartree and Hartree–Fock approximations, including the σ, ω, π, and ρ mesons, are developed in order to explore the behavior of the nuclear charge radii and the binding energies of several isotopic chains. We find a correlation between the magnitude of the anomalous kink effect (KE) in the Pb isotopic family and the incompressibility modulus (K) of nuclear matter. The KE appears to be sensitive, in particular, to the mechanisms that control the K value. The influence of the symmetry energy on the Ca isotopic chain is also studied. The behavior of the charge radii of single-particle states for some special cases and its repercussion on the nuclear charge radius is analyzed. The effect of pairing correlations on the models improves considerably the quality of the results in both binding energy and KE.