• POSSIBLE MEASUREMENT OF THE VACUUM POLARIZATION IN HEAVY-ION SCATTERING. Johann Rafelski and Abraham Klein, Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania 19174 (Received 21 November 1973).

A measurement of the vacuum polarization potential in nonrelativistic elastic heavy-ion scattering is suggested. We find that in a typical sub-Coulomb barrier event enough momentum is transferred from the projectile to the target nucleus to make the high q^2 behavior of the photon propagator observable. The elastic cross section is increased in a typical case by 2.5% above the Rutherford value. Only relative measurements are needed.

(C, May)

• RADIATIVE DECAY OF NEUTRON RESONANCES IN ^{73}Ge$(n,\gamma)^{74}$Ge. R. E. Chrien, D. I. Garber, J. L. Holm, and K. Rimawi, Brookhaven National Laboratory, Upton, New York 11973 (Received 8 January 1974).

γ rays following neutron capture in natural germanium have been studied up to $E_n \approx 500$ eV with the fast chopper at the Brookhaven high flux beam reactor. Up to this energy only resonances in ^{73}Ge contribute. From the high-energy γ rays observed, levels in ^{74}Ge are identified to an excitation energy of about 3 MeV. From the low-energy γ rays depopulating the ^{74}Ge levels, spin assignments for several ^{73}Ge resonances are made; namely 102 eV, $J^\pi = 4^+$; 204 eV, $J^\pi = 5^+$; and 224 eV, $J^\pi = 4^+$. The results of the resonance capture experiments are compared to previous "average-resonance" and thermal-capture work, and in general are found to be in good agreement. Average radiative strengths for $M1$ and $E2$ transitions are calculated and compared to model estimates.

(C, May)

• EXCITATION FUNCTIONS FOR (p,n) REACTIONS TO 25 MeV ON ^{63}Cu, ^{65}Cu, AND ^{107}Ag. R. Collé, R. Kishore, and J. B. Cumming, Chemistry Department, Brookhaven National Laboratory, Upton, New York 11973 (Received 3 December 1973).

Absolute cross sections for the (p,n) reactions on ^{63}Cu, ^{65}Cu, and ^{107}Ag at proton energies from 2.5 to 25 MeV were determined by the activation method. Metal foil targets of natural isotoptic abundance were used; therefore, the results for ^{63}Zn above 22.3 MeV and for ^{107}Cd above 18.8 MeV include contributions from $(p,3n)$ reactions. Beam intensities were measured with a Faraday cup. Disintegration rates of the product nuclei were determined by assaying their γ rays with calibrated Ge(Li) detector systems. Comparisons of the present cross sections are made with a complete compilation of previous measurements and with calculations based on a Monte Carlo intranuclear-cascade–statistical-evaporation model. Half-lives for ^{63}Zn and ^{107}Cd were determined to be 38.0 ± 0.1 min and 6.50 ± 0.02 h, respectively.

(C, May)

• VARIATIONAL CALCULATION OF LIGHT NUCLEI USING NEARLY ORTHOGONAL FUNCTIONS. N. E. Reid,* N. E. Davison, and J. P. Svenne, Department of Physics, University of Manitoba, Winnipeg 19, Manitoba, Canada (Received 30 August 1973).

A Hartree-Fock–like variational calculation which is specifically directed toward the treatment of axial and triaxial deformations in light nuclei is presented. By choosing Cartesian harmonic-oscillator wave functions to be the trial wave functions and taking the oscillator length parameters b_x $[=(\hbar/m\omega_x)^{1/2}]$, b_y, b_z in each major oscillator shell to be the variational parameters, the capacity for deformation is built into the wave functions from the outset and a substantial reduction in the calculational effort is achieved. These variational wave functions are not strictly orthogonal, but the effects of this approximation appear to be relatively unimportant. A realistic, two-body effective interaction is employed which depends on the average density of the nucleus under consideration. It is constructed from nuclear matter theory and has been shown to contain the most important physical aspects of the Brueckner G matrix. The shapes of the intrinsic states of $4n$ nuclei are found to be more complicated than simple spheroids or ellipsoids, often exhibiting large hexadecapole moments. Ground-state properties including binding energies, rms charge radii, and multipole moments are calculated and found to be in accord with experimental results and earlier calculations.

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(C, May)

• HIGH-MOMENTUM-TRANSFER ELECTRON SCATTERING FROM ^{24}Mg, ^{27}Al, ^{28}Si, AND ^{32}S. G. C. Li and M. R. Yearian, High Energy Physics Laboratory and Department of Physics, Stanford University, Stanford, California 94305, and I. Sick, High Energy Physics Laboratory, Stanford University, Stanford, California 94305, and Physics Department, University of Basel, Basel, Switzerland (Received 23 April 1973; revised manuscript received 21 January 1974).

High-momentum-transfer elastic electron scattering data ($0.76 \leq q \leq 3.74$ fm^{-1}) from ^{24}Mg, ^{27}Al, ^{28}Si, and ^{32}S are presented and analyzed using phenomenological charge distributions; the oscillation in $\rho(r)$ due to the shell-model structure is obtained. An analysis in terms of a Woods-Saxon nuclear potential is described and the $2s/1d$ occupation numbers are deduced. The cross sections for certain strongly excited or well isolated inelastic levels are also given, but not analyzed.

(C, May)

• PHOTOPROTON CROSS SECTION OF ^{26}Mg. D. W. Anderson, Department of Radiological Sciences, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma 73104, and R. F. Petry and H. J. Fischbeck, Department of Physics and Astronomy,