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from ^{208}Pb and ^{209}Bi were measured over the range 18°–116°. Pronounced structure is observed at the larger angles. Optical-model analyses yield good fits to the data with $V \sim 120$ MeV and $J_R \sim 270$ MeV fm^3. The diffuseness term for the absorption well is larger and the radius smaller than for the real well. A grid-type analysis yielded evidence for discrete families of potentials similar to those observed for medium mass targets. (C, July)

*Present address: Research Department, Technical Center, Caterpillar Tractor Company, Peoria, Ill. 61602.

†Visiting scientist at Oak Ridge National Laboratory, Oak Ridge, Tenn. 37830.

Shape transitional aspects of odd-A Eu isotopes studied by the (p,t) reaction. H. Taketani*, H. L. Sharma †, and Norton M. Hintz, *J. H. Williams Laboratory of Nuclear Physics, University of Minnesota, Minneapolis, Minnesota 55455.* (Received 17 December 1974; revised manuscript received 31 March 1975)

The abrupt shape transition as is observed around $N \cong 88$–90 in even nuclei has been examined for the odd-A Eu isotopes $^{151}Eu_{88}$ and $^{149}Eu_{86}$ by the (p,t) reaction at 18.5 and 19.0 MeV with an average resolution of 10 keV. Angular distributions, taken from 10 to 70°, enabled unambiguous indentification of many $L = 0$ ($J_f^\pi = 5/2^+$) transitions in both residual nuclei; seven for ^{151}Eu and seven or eight for ^{149}Eu. The summed $L = 0$ cross sections are close to those of the (p,t) reactions for the neighboring even-A Sm isotopes connecting the same neutron numbers. A number of new levels have been found in both isotopes. We have obtained markedly different level structures for the two neighboring isoptopes. In ^{151}Eu, whose ground state and low-lying states below 200 keV can be described in terms of spherical shell-model configurations, two deformed bands have been tentatively identified. One of these is a $5/2^+[413]$ band with members at 261 keV, $5/2^+$; 414 keV, $(7/2^+)$; and possible a 597 keV, $(9/2^+)$ member. In addition a $5/2^+[413]$ β band is postulated with members at 654 keV, $5/2^+$; 801 keV, $(7/2^+)$. These deformed states, coexisting with the spherical states, have been strongly excited while the spherical low-lying states have shown vanishingly small (p,t) cross sections. The (p,t) cross sections to the ^{151}Eu states were found to be in strong anticorrelation with B ($E2$) values from Coulomb excitation and (d,d') cross sections leading to the same final states. On the other hand, ^{149}Eu has shown the usual (p,t) pattern of a strong ground state transition and weak excited state transitions, showing similar coupling schemes are involed in the ground states of ^{151}Eu and ^{149}Eu. The detailed experimental results up to 1.6 MeV excitation in both nuclei and their interpretation for some of the levels are presented. (C, July)

*Present address: Department of Applied Physics, Tokyo Institute of Technology, Meguro, Tokyo, Japan.

†Present address: Schuster Laboratory, University of Manchester, England.

^{37}Cl$(p,n)^{37}$Ar excitation function up to 24 MeV: Study of (p,n) reactions. R. Kishore*, R. Collé†, S. Katcoff, and J. B. Cumming, *Chemistry Department, Brookhaven National Laboratory, Upton, New York 11973.* (Received 17 June 1974; revised manuscript received 10 February 1975)

Cross sections for the ^{37}Cl$(p,n)^{37}$Ar reaction were determined from 2 to 24 MeV by the activation method. NaCl targets of natural isotopic composition were irradiated inside of Al cells having thin Havar windows. Beam intensities were determined with a Faraday cup and the ^{37}Ar disintegration rates were measured with internal gas proportional counters. The cross sections (±6% uncertainty) increase from threshold (1.64 MeV) to a broad maximum of 365 mb at 10 Mev and then decrease to 34 mb at 23.5 MeV. These results and five other recently measured (p,n) excitation functions are compared with each other and with various cascade-evaporation calculations. Reasonable agreement was attained between experiment and calculation, and possible sources of remaining discrepancies are discussed. The ^{37}Ar half-life is observed to be 35.02 ± 0.05 day, in good agreement with previously reported values. (C, July)

*Present address: Department of Nuclear Medicine, Veterans Administration Hospital, Albany, N. Y. 12208.

†Present address: Radiation Physics C114, National Bureau of Standards, Washington, D. C. 20234.

^{4}He$(p,2p)^3$H and ^{4}He$(p,pd)^2$H reactions at 156 MeV. R. Frascaria, P. G. Roos*, M. Morlet, N. Marty, A. Willis, V. Comparat, and N. Fujiwara†, *Institut de Physique Nucléaire, Orsay, France.* (Received 17 March 1975)

Quasifree proton-proton and proton-deuteron scattering cross sections on ^{4}He have been measured and compared with theoretical calculations in the distorted wave impulse approximation. Information on the low components for the proton and deuteron momentum distributions in ^{4}He are deduced. (C, July)

*Present address: University of Maryland, College Park, Md. 20742.

†Present address: University of Kyoto, Kyoto, Japan.

^{12}C$(^{12}$C,$\alpha)^{20}$Ne excitation functions and angular distributions. L. R. Greenwood, R. E. Segel, K. Raghunathan, and M. A. Lee, *Northwestern University, Evanston, Illinois 60201 and Argonne National Laboratory, Argonne, Illinois 60439;* H. T. Fortune, *Argonne National Laboratory, Argonne, Illinois 60439 and University of Pennsylvania, Philadelphia, Pennsylvania 19104;* J. R. Erskine, *Argonne National Laboratory, Argonne, Illinois 60439.* (Received 13 March 1975)

Excitation functions have been measured at a laboratory angle of 5° over an incident energy range of 18–25.5 MeV (c.m.) for the ^{12}C$(^{12}$C,$\alpha)$ reaction leading to about 30 levels in ^{20}Ne (E_x = 0–20 MeV). Angular distributions were measured at five energies. An Ericson fluctuation analysis yields the result that most levels are populated by a large nonstatistical reaction component. A significant compound-nuclear component is also present, with correlation widths on the order of 150–250 keV (c.m.). The energy-averaged cross sections have been compared with statistical compound-nuclear (Hauser-Feshbach) calculations. This comparison indicates the presence of a strong direct-reaction mechanism, especially for the members of the proposed 8p-4h band (at 7.196, 7.834, 9.040, and 12.16 MeV). A pronounced minimum in the excitation functions is evident at $E_{c.m.}$ = 19.2 MeV, near the recently reported strong resonance in the ^{12}C$(^{12}$C,$p)^{23}$Na channel. Other correlated effects also appear to be present at specific energies, but the cross correlations, calculated for the entire energy range, are largely statistical. (C, July)

Coulomb corrections for extracting spectroscopic factors using analyticity. L. S. Kisslinger and K. Nichols, *Department of Physics, Carnegie-Mellon University, Pittsburgh, Pennsylvania 15213.* (Received 7 April 1975)

The Coulomb scattering and Coulomb distortions are included i the optimal expansion technique in the cosθ plane. From p-^{3}He elastic scattering from 4–20 MeV an energy independent spectroscopic factor for $^3\text{He} \rightarrow p + d$ is found, with an accuracy a few percent. The method seems most promising for transfer reactions. (C, July)

Off-shell Jost function and T matrix for the Morse potential. B. Talukdar, M. N. Sinha Roy*, N. Mallick, and D. K. Nayek, *Department of Physics, Bolpur College, Bolpur 731204, West Bengal, India.* (Received 7 January 1975)