SECTION II

ABSTRACTS AND/OR TITLES OF TALKS AT AMERICAN PHYSICAL SOCIETY MEETINGS AND OTHER MEETINGS AND CONFERENCES (JULY 1981-JUNE 1982)

Isospin Dependence of Configuration-Mixing Effects on $\sigma\tau$ Excitation Strengths.* B.A. BROWN, Oxford Univ., and W. CHUNG and B.H. WILDENTHAL, Mich. State U.--We have used the Chung-Wildenthal (full d5/2-s1/2-d3/2 space) shell-model wave functions to study the systematic behavior of $\sigma\tau$ transition strengths. This model allows us to carry out exact calculations for transitions of $\Delta T=+1$, 0, and -1 in a space which puts no constraint upon the microscopic spin-flip mode. In this model space the sum rule $<\beta^->-<\beta^+>=(N-Z)$ holds, where the $<\beta>$ represent the total Gamow-Teller beta decay strengths from some chosen initial state. We refer the results obtained with the C-W ground-state wave functions to results obtained with using the leading shell-model basis state as the unit-amplitude, single-component wave function for the same ground states. As examples, for the pure-neutron case (^{22}O) we find that the $T=3\rightarrow T=2$ strength is enhanced by a factor of 1.05 and the $T=3\rightarrow T=3$ strength is quenched to 0.5 the pure configuration value. For the more complex case of active protons and neutrons (^{22}Ne), and the $T=1\rightarrow T=0$ strength is quenched to 0.8, the $T=1\rightarrow T=1$ strength to 0.5 and the $T=1\rightarrow T=2$ strength to 0.1, relative to the respective values for the assumption of a pure configuration wave function.

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Resonant Structure in ^{14}C Induced Reactions.* F. HAAS, Cyclotron Lab., Michigan State U.--Until very recently the strong resonant structure observed in light heavy-ion integrated cross sections has been confined to reactions involving ^{12}C and ^{16}O nuclei. The first experimental result showing that strong resonant behavior could also be observed in ^{14}C induced reactions was reported by Freeman et al for the ^{12}C + ^{14}C system. All experimental data now available for elastic and reaction channels of the ^{12}C+^{14}C, ^{14}C+^{14}C and ^{14}C+^{16}O reactions will be presented with special emphasis on the recently measured fusion and direct reaction cross sections in ^{14}C+^{14}C and ^{14}C+^{14}C[2]. The observation of strong resonant structure in all these ^{14}C induced reactions is similar to the results obtained previously in ^{12}C+^{16}O and ^{16}O+^{16}O. This correlation can be understood in terms of a common surface transparent interaction due to the limited number of open direct reaction channels at high energies.

*Supported in part by National Science Foundation.
[1]R.M. Freeman et al., Phys. Lett. 90B, 229 (1980).
[2]Strasbourg-Munich collaboration, Phys. Rev. (to be published).

Systematics of the Gamow-Teller Strength Function.* G.F. BERTSCH, Mich. State U. East Lansing, MI--A useful description of the strength function is given by the particle-hole model, in either RPA or TDA approximations. The model is completely specified by the single-particle Hamiltonian and the residual interaction. Results are not very sensitive to the choice of single-particle potential, except for the spin-orbit field. Structural features in the response are sensitive to the overall strength of the residual interaction, but not to the range or other details of strength of the residual interaction, but not to the range or other details of the interaction. Typically, the competition between the single-particle spin orbit field and the residual interaction leads to a split of the Gamow-Teller state into two major components, the upper having three quarters of the total strength. The predicted A-dependence of the Q-value for the Gamow-Teller state is less smooth than the data shows, indicating an empirical suppression of shell effects. The L=1 response gives information about the momentum dependence of the interaction. The experimental energy of the L=1 $\sigma\tau$ strength is consistent with a weak momentum dependence. This stands in contrast to the interaction in the τ channel, which has a substantial repulsive momentum dependence. The distribution of strength among different isospin final states is governed by the correlations in the parent ground state. Correlations of the alpha-clustering type reduce the $T\rightarrow T+1$ strength in light nuclei by a factor of four. With the possibility of studying the $\sigma\tau_+$ strength experimentally via the (d,pp) reaction, it would be interesting to see whether these strong correlations persist to heavy nuclei.

An Entrance Channel Effects in the ^{12}C+^{18}O and ^{13}C+^{17}O Fusion Reactions. B. HEUSCH, C. BECK, J.P. COFFIN, P. ENGELSTEIN, R.M. FREEMAN, G. GUILLAUME, F. HAAS, and P. WAGNER, Centre de Recherches Nucleaires, Strasbourg, France.--To study the influence of the entrance channel on compound nucleus formation, ^{30}Si is one of the most attractive case among light heavy-ion systems because it can be reached by six different entrance channels. In the present experiment, the fusion cross sections have been measured for two of these channels: ^{12}C+^{18}O and ^{13}C+^{17}O which differ not only in Q-values ($\Delta Q=3.1$ MeV) but also in channel spin ($\Delta S=3$). We have extended measurements to higher energies using oxygen beams between 85 to 140 MeV from the upgraded 16 MV tandem accelerator in Strasbourg. The fusion cross sections (σ_F) have been obtained at each energy from the angular distributions of the heavy reaction products after complete A and Z identifications. The critical angular momenta deduced from σ_F using the sharp cut-off approximation differ for the two systems by 1 to 2 units at ^{30}Si excitation energies between 60 to 80 MeV. These results will be compared to similar experimental studies on neighbouring systems and with predictions of the different models proposed to explain the limitation of fusion cross sections at high energies.

Cross Sections and Analyzing Powers for ^{154}Sm, ^{166}Er($\vec{p}$,p) at 134 MeV.* R.M. RONNINGEN, N. ANANTARAMAN, G.M. CRAWLEY, Michigan State U., B.M. SPICER, G.G. SCHUTE, J.M.R. WASTELL, Univ. of Melbourne, D.W. DEVINS, D.L. FRIESEL, Indiana U.--Measurements of deformations and multipole moments of higher order than quadrupole permit sensitive tests of nuclear structure and reaction mechanism theories. Across the rare earth region the hexadecapole deformations change sign but little is known about hexacontatetrapole deformations. Intermediate energy proton scattering should be sensitive to these features. Angular distributions of elastically and inelastically scattered protons were measured from the ^{154}Sm, ^{166}Er($\vec{p}$,p') reactions at 134 MeV, at I.U.C.F. Differential cross sections and analyzing powers were extracted for ground band rotational states to spin-parity $J^\pi=6^+$. The angular ranges of these data are 22.5° to 77.5° (^{154}Sm) or 70° (^{166}Er), in 2.5° steps. The data for the 6^+ states shows that the overall magnitudes of the cross sections are quite different and that the respective angular distributions are out of phase for most of the angular range. The data are being analyzed using the coupled channels code ECIS.

Spin-flip Strength in Nuclei.*, AARON GALONSKY, Michigan State U.--In addition to the isobaric analog state, another strong transition has been observed[1,2] in (p,n) reactions up to 200 MeV. This transition appears to be the reaction analog of allowed Gamow-Teller beta decay wherein L=0, but there is spinflip, i.e., S=1. Comparison at several energies of angular distributions with microscopic calculations supports this identification. Particularly as E_p increases, the increasing ratio of the isovector spinflip to the non-flip component of the effective nucleon-nucleon interaction picks out the S=1 transitions. The observed strength of the Gamow-Teller transition is roughly half of that expected on the basis of simple models. The spinflip operator should also induce a transition to a parent state in the target nucleus via the (p,p') reaction; this has now been seen with 200-MeV protons[3] in many nuclei between A=51 and 100. The (p,n) experiments also give evidence of isovector L=1, S=0 and S=1 strength concentrations.

*Supported by the National Science Foundation.

[1]R.R. Doering, A. Galonsky, D.M. Patterson, and G.F. Bertsch, Phys. Rev. Letters 35, 1691 (1975).
[2]D.E. Bainum, J. Rapaport, C.D. Goodman, D.J. Horen, C.C. Foster, M.B. Greenfield, and C.A. Goulding, Phys. Rev. Letters 44, 1751 (1980).
[3]N. Anantaraman, G.M. Crawley, A. Galonsky, C. Djalali, N. Marty, M. Morlet, A. Willis, and J.-C. Jourdain, Phys. Rev. Letters 46, 1318 (1981).

Light Particle Spectra from 100 and 150 MeV/u ^{20}Ne+Al and Au*, G.D. WESTFALL, N. ANANTARAMAN, G.M. CRAWLEY, M. CURTIN, C.K. GELBKE, B. JACAK, B. HASSELQUIST, W.A. LYNCH, D.K. SCOTT, and M.B. TSANG, Michigan State U., M.J. MURPHY and T.J.M. SYMONS, Lawrence Berkeley Laboratory, R. LEGRAIN, CEN SACLAY, and T.J. MAJORS, Sandia National Laboratory--Using beams of 100 and 150 MeV/u ^{20}Ne from the LBL Bevalac, angular distributions and energy spectra were measured for p,d,t,^{3}He and ^{4}He from 30° to 130° in the lab. Seven light particle telescopes and two heavy ion telescopes (at $\pm$10° lab) were used to measure single- and multi-particle inclusive spectra simultaneously. The inclusive data are compared with the firestreak model and with the systematics of Awes[1] et. al. for the evolution of the temperature of a moving source. Preliminary analysis of proton spectra from 150 MeV/u ^{20}Ne+Au yields a temperature of 35 MeV. The ratio of composite light particle to proton production cross sections are extracted and compared to ratios at much lower and higher energies.

*Work supported by National Science Foundation

[1]T.C. Awes et. al., Phys. Lett. to be published.

Comparison of preequilibrium neutron and proton emission in ^{16}O induced reactions on ^{238}U at 310 MeV.* J. KASAGI, S. SAINI, T.C. AWES, A. GALONSKY, C.K. GELBKE, G. POGGI, D.K. SCOTT, Michigan State University, K.L. WOLF, Argonne National Laboratory, R.L. LEGRAIN, Lawrence Berkeley Laboratory--The emission of precompound neutrons and protons in coincidence with fission fragments was measured for the reactions ^{238}U(^{16}O,pf) and ^{238}U(^{16}O,nf) at 310 MeV. Larger cross sections were observed for the emission of high-energy protons than for the emission of high-energy neutrons. The differences in spectral shapes are likely to arise from the different barrier penetrabilities for protons and neutrons and, to a lesser extent, from final state interactions. The observed differences in proton and neutron cross sections make it difficult to understand the success of the coalescence model in the description of composite light particle spectra. Qualitatively the observed trends agree with the prediction of the precompound model of M. Blann.[1]

*Work supported by the National Science Foundation.

[1]M. Blann, Phys. Rev. C23 (1981) 205.

Systematics of light particle emission in ^{16}O induced reactions at 140, 215, and 310 MeV.* T.C. AWES, C.K. GELBKE, G. POGGI, S. SAINI, G.D. WESTFALL, Michigan State University; R. LEGRAIN, Lawrence Berkeley Laboratory--The emission of energetic light particles (p,d,t) has been studied for ^{16}O induced reactions on Al, Zr and Au targets. The light particle energy spectra have been analyzed in terms of a moving thermal source. The apparent temperatures exhibit a systematic variation as a function of particle type and incident energy per nucleon above the Coulomb barrier. The observed trend can be extrapolated in a smooth fashion to temperatures obtained in relativistic heavy ion reactions. The validity of the coalescence relation for the production of composite light particles is tested down to the beam energy of $(E-V)/A \approx 4$ MeV. The energy dependence of the p/d-ratio will be discussed.

*Work supported by the National Science Foundation.

In-plane light particle correlation for ^{16}O-induced reactions on ^{27}Al and ^{197}Au at 310 MeV.* W.G. LYNCH, L.W. RICHARDSON, M.B. TSANG, R. ELLIS, C.K. GELBKE, R.L. WARNER, Michigan State U.--In-plane angular correlations for outgoing protons and deuterons have been investigated for ^{16}O-induced reactions on ^{27}Al and ^{197}Au targets at 310 MeV. The observed correlations exhibit variations of up to 50%. They cannot be explained by assuming thermal emission from a moving source an assumption that gave a good description of earlier single particle inclusive measurements. Simple model calculations will be presented to demonstrate that phase space constraints due to momentum and energy conservation can have an important effect on the observed two-particle correlation function.

*Work supported by the National Science Foundation.

WINTER SCHOOL ON THEORETICAL ASPECTS OF HEAVY ION COLLISIONS, HERSCHEGG, AUSTRIA, January 1982

and

WINTER SCHOOL ON HEAVY ION PHYSICS, BORMIO, ITALY, January 1982

Subthreshold Pion Production by Heavy Ions. WALTER BENENSON, Michigan State U.--The most recent data on pion production below the nucleon-nucleon threshold with heavy ions consist of an angular distribution at E/A = 138 MeV for ^{20}Ne+NaF. The data were taken at the LBL Bevalac by a MSU-LBL-Orsay-Tokyo collaboration. The results can be summarised as follows: 1) There is a very large π^-/π^+ ratio at 0° indicating that cold charged projectile fragments still exist after the collision even at this low energy. 2) The angular distribution is isotropic in the center of mass frame, which may indicate a predominance of thermal production rather than first collision nucleon-nucleon production. 3) The magnitude of the cross section is in good agreement with previous work and is smaller than the full firestreak calculation with all composite particles and resonances as can be seen in the figure. The amount and type of composite particles included affects the pion cross section very strongly because of the very strong temperature dependence. This can be seen on the figure by comparing firestreak calculations with and without α's, t's and ^{3}He's. The curve labelled thermal comes from the model of Kapusta and the curve labelled Hecking is a first collision + thermal calculation.

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W. Benenson, G. Bertsch, G.M. Crawley, E. Kashy, J.A. Nolen, Jr., H. Bowman, J.G. Ingersoll, J.O. Rasmussen, J. Sullivan, M. Koike, M. Sasao, J. Peter, T.E. Ward, Phys. Rev. Lett. 43, 683 (1979), 44, 54 (1980).
G.D. Westfall, J. Gosset, P.J. Johansen, A.M. Poskanzer, W.G. Meyer, H.H. Gutbrod, A. Sandoval and R. Stock, Phys. Rev. Lett. 37, 1202 (1976).
J.I. Kapusta, Phys. Rev. C16, 1493 (1977).
P. Hecking, LBL-12671 and private communication.

Disassembly of Nuclear Matter, David K. Scott, Michigan State University.

AMERICAN PHYS. SOC. WASHINGTON, DC, April 1982

High Spin States in ^{128}Ce, J. CARVALHO,[1,2] F. BERNTHAL,[1,3] R. RONNINGEN,[1] M. FEWELL,[2] J. HATTULA,[2] N. JOHNSON,[2] I. LEE,[2] H. OWER,[4] L. RIEDINGER,[4] AND J. WELLS[5]--The high spin states in ^{128}Ce have been studied via the bombardment of ^{112}Cd with a 103-MeV ^{20}Ne beam. Seven Ge(Li) detectors were placed in the horizontal plane about the target, and two large NaI detectors were used as a total γ-ray filter in order to select the 4n reaction channel. The yrast band has been established to 22^+ (possibly to 24^+). Also, we have established two sidebands, but were able to determine the feeding pattern into the yrast sequence for only one of these. The strong (first) backbend of the yrast band derives from the crossing of the ground state band with a highly aligned $h_{11/2}$ two-quasiproton band. This band assignment is consistent with both the alignment gain and crossing frequency predicted by Cranking shell model calculations. In the I_x vs. ω plot for ^{128,130,132}Ce, the s-bands are amazingly similar but the g-bands have very different I_x values probably due to deformation changes.

[1]Michigan State U.
[2]Oak Ridge National Lab.
[3]U.S. Senate.
[4]Univ. of Tennessee
[5]Tennessee Tech. U. ORNAL is operated by Union Carbide Corp. for the USDOE.

Entry Line Measurements in Residues from the Fusion of ^{16}O + ^{12}C. I. <M_γ>, L.J. SATKOWIAK, J.J. KOLATA, P.A. DEYOUNG, AND R.M. FREEMAN, U. of Notre Dame*, F.W. PROSSER and R.A. RACCA, U. of Kansas**, A. GALONSKY, J. KASAGI, B. REMINGTON, and F. HAAS, Michigan State U.*--Average γ-ray multiplicities in the decays of evaporation residues from ^{16}O + ^{12}C fusion have been measured at seven c.m. energies between 20 and 26 MeV. A Ge(Li) detector was used to measure characteristic γ-radiation from the evaporation residues, and the corresponding multiplicities were determined with an array of six 10 c.m. x 10 c.m. NaI detectors having total efficiency times solid angle $\varepsilon\Omega$ = 0.08. For each event, the Ge(Li) energy and a bit pattern identifying the coincident NaI detector(s) were written on tape. A sampling technique was used to simultaneously determine the Ge(Li) "singles" spectrum. Results of these measurements will be presented.

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Angular Momentum Dependence of Neutron Spectra in the 250-MeV $^{64}Ni + ^{92}Zr$ Reaction, W. KUHN, I. AHMAD, P. CHOWDHURY, R.V.F. JANSSENS, T.L. KHOO, Argonne*, F. HAAS,** J. KASAGI, R.M. RONNINGEN, Michigan State U.***--Neutron spectra in coincidence with the γ-ray sum energy have been measured in the $^{64}Ni + ^{92}Zr$ reaction, using a 250-MeV Ni beam from the ANL superconducting linac. Time-of-flight and pulse-shape discrimination techniques were employed to identify the neutrons and a 33 x 30 cm NaI detector was used to measure the γ-sum energy. The compound nucleus ^{156}Er is produced at relatively low excitation energy and its decay is dominated by the $2n$ channel. This accentuates the angular-momentum dependence of the neutron spectra. We observe that the spectra coincident with higher γ-sum energies, corresponding to the decay of higher angular momentum states, are characterized by lower temperatures. Presumably, this reflects the fact that the excitation energy above the compound nucleus yrast line decreases with ℓ. These results will be compared with statistical-model predictions.
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***Supported by the National Science Foundation.

The Role of Quark Pauli Effects for the ^3He Density, Y. SUZUKI and K.T. HECHT, Univ. of Michigan,* and H. TOKI, Michigan State U.*--The 3-particle point density of ^3He extracted from electromagnetic form factors at large momentum transfer shows a pronounced central depression[1] which is not accounted for by detailed 3-body treatments using realistic 2-body NN interactions. The effect of quark constituents of the nucleons is studied by the resonating group method (RGM). Analytic expressions for the RGM norm kernel make it possible to examine the question: To what extent are Pauli exclusion effects among quarks responsible for the central dip in the ^3He density? The identification of quark exchange terms in the RGM norm kernel involving all 3 nucleons make it possible to separate 3-body effects from the 2-body effects already present in the NN interaction. The initial conclusion is that Pauli effects alone do not account for the central dip in the ^3He density.
*Supported by the National Science Foundation.
[1]J.S. McCarthy, I. Sick, and R.R. Whitney, Phys. Rev. C15, 1396 (1977).

Shell Model Calculations for the N=82 Nuclei, HANS G.W. KRUSE and B.H. WILDENTHAL, Mich. State U.*--Shell model calculations are being made for the N=82 isotone chain from ^{133}Sb to ^{147}Tb. These calculations include the $g_{7/2}$, $d^D_{5/2}$, $d_{3/2}$, $s_{1/2}$, and $h_{11/2}$ orbits and, in order to reduce the dimensionality of the model space to a manageable size, a truncation scheme must be used. Even though seniority is not a rigorously good quantum number, we have found that the wave functions of the lowest for eigenstates of a given spin contain only very small components with seniority greater than 3. We are therefore able to truncate the shell model basis by restricting the wave functions to include only those basis states with seniority less than 4. With this model space we are proceeding to determine residual interactions through a comparison with the experimental data available in the mass range A=133 to A=145. We will then use these interactions to study the region of the suggested shell closure at Z=64, specifically the nuclei ^{146}Gd and ^{147}Tb.
*Work supported in part by the National Science Foundation.
[1]B.H. Wildenthal et al., Phys. Rev. C3, 1199 (1971).
[2]Y. Nagai et al., Phys. Rev. Lett. 47, 1259 (1981).

Proximity to the Rho Meson Condensation Threshold in Nuclei,* H. TOKI, Michigan State U. and JOSEPH R. COMFORT, U. of Pittsburgh--We have studied the critical conditions for instability in the isovector unnatural parity channel in terms of the RPA.[1] The particle-hole interaction consists of the π and ρ (2π) meson-exchange attractive components in addition to the short range repulsive Landau term. It is found that the non-resonant part of the iterated two-pion exchange moves the characteristics of the nuclear phase transition closer to those for rho-meson condensation. This fact has close connection to the enhancement of the magnetic form factor of electron scattering at large momentum transfer.
*Submitted by WILLIAM A. FRIEDMAN.
[1]H. Toki and J.R. Comfort, Phys. Rev. Lett. 47 (1981).

The Transitional Odd-A Nuclei in the IBFA Model, OLAF SCHOLTEN, Mich. State U.*--Properties of the odd mass Eu isotopes are investigated in the framework of the Interacting Boson-Fermion Approximation (IBFA) model. It is shown that in the IBFA model a rather detailed and yet simple description can be given of odd mass nuclei ranging from spherical (^{147}Eu) to strongly deformed (^{155}Eu). Calculated excitation energies, proton separation energies, E2 and M1 transition probabilities, quadrupole and magnetic moments, and spectroscopic factors are compared with experiment.
*Research supported in part by the U.S. National Science Foundation.

Longitudinal E2 Form Factors for Even-Mass sd-Shell Nuclei*, R. RADHI, W. CHUNG, B.A. BROWN, and B.H. WILDENTHAL, Michigan State U.--The longitudinal E2 form factors for inelastic electron scattering on even-mass sd-shell nuclei have been calculated in plane-wave Born approximation utilizing wave functions for the initial and final states obtained from Chung-Wildenthal Hamiltonians. Single-particle wave functions are assumed to have harmonic oscillator radial dependence with normalizations such that the experimentally measured ground-state rms values are reproduced. Conventional corrections are made for center-of-mass, finite-proton-size and effective momentum transfer effects. Attention is directed to the shapes of the calculated transition densities, to the systematics of the relationship between shapes of observed and calculated form factors and to the relationship between the ratios of calculated and measured (by non-electron-scattering experiments) B(E2) values of these transitions and the ratios of calculated and measured maximum values of the E2 form factors. The effective charges needed to normalize the calculated form factors to experiment are generally larger then the values obtained in normalizing to B(E2) values from non-electron-scattering experiments.
*Research supported in part by National Science Foundation.

Entry Line Measurements in Residues from the Fusion of $^{16}O + ^{12}C$. II. $<E_\gamma>$, F.W. PROSSER and R.A. RACCA, U. of Kansas*, J.J. KOLATA, L. SATKOWIAK, P. DEYOUNG and R.M. FREEMAN,** U. of Notre Dame, A. GALONSKY, J. KASAGI, F. HAAS and B. REMINGTON, Michigan State U.**--A series of experiments is in progress at Notre Dame to locate the entry lines in the residues from the fusion of $^{16}O + ^{12}C$. This is a preliminary report on the measurement of the average -ray energies in the cascades leading to each final residue. The experiments were done with a Ge(Li) detector and a tightly collimated, 23 cm diam.x12 cm NaI detector. For each coincident event the pulse heights from each detector and from a TAC were stored on magnetic tape. The NaI spectra for specific residues were determined by selecting peaks in the Ge(Li) spectrum which corresponded to known transitions in each residue. Representative sorted spectra will be shown and their implications discussed.
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**Supported by grants from the National Science Foundation.

^{254}Es Decay Revisited.* Z.M. KOENIG, I. AHMAD, J. MILSTED, and Wm. C. McHARRIS, Migh. State Univ., Argonne Natl. Lab., and Lawrence Berkeley Lab. A ^{254}Es source deposited by the ANL e-m isotope separator and having $\approx 6.5 \times 10^6 \alpha$ dpm, more than 10^3 times as hot as the source used originally, was used to study the weaker branches in its α decay. Experiments included α, γ, and e^- measurements in singles and various coincidence combinations. Some 35α and 45γ transitions were identified. All four low-lying rotational bands previously placed were confirmed. Two new $K^\pi=6^+$ bands were placed, based on the triplet couplings of $\pi 7/2^+[633\uparrow] \times \nu 5/2^+[622\uparrow]$ (at 355.3 keV) and $\pi 5/2^+[642\uparrow] \times \nu 7/2^+[613\uparrow]$(at 406.3 keV). Also, states were placed at 316.1 ($K^\pi=5^+$) and 551.8 keV (K=8?). Band distortions and transition probabilities were interpreted in terms of Coriolis couplings.
*Work supported in part by the USNSF (Grant PHY 78-01684) and the USDOE.
[1]W. McHarris, F.S. Stephens, F. Asaro, and I. Perlman, Phys. Rev. 144, 1031 (1966).

Ml Excitation of Nuclei By Inelastic Proton Scattering.* N. ANANTARAMAN, Michigan State U.--The giant Ml excitation, long sought for in medium-weight and heavy nuclei, has been observed in the inelastic scattering of 200-MeV protons on many targets, including ^{40}Ca, ^{51}V, ^{58,60,62}Ni, and the even Zr and Mo isotopes.[1] This work is the result of a continuing collaboration between groups from Orsay and MSU at the Orsay synchrocyclotron. The Ml identification is based upon the excitation energies (between 8 and 11 MeV) and angular distributions (very forward peaked) of structures observed in the proton spectra. The high bombarding energy favors the excitation of spin-flip strength because of the nature of the effective nucleon-nucleon interaction.[2] The structures are mostly broad (FWHM 1-2 MeV). In the case of ^{58,60,62}Ni, additional, sharp peaks are observed at higher excitation energies; these are interpreted to be a part of the (T_0+1) component of the Ml strength. Microscopic distorted wave impulse approximation calculations using reasonable shell-model wave functions have been performed for some of the transitions. They match the shapes of the angular distributions quite well, but predict cross sections about 3 times too large. In cases where comparison can be made, similarly large quenching factors are found in (e,e') reactions,[3] as well as in (p,n) reactions populating the analogues of the Ml states.[4]
*Supported by the National Science Foundation.
[1]N. Anantaraman, G.M. Crawley, A. Galonsky, C. Djalali, N. Marty, M. Morlet, A. Willis, and J.-C. Jourdain, Phys. Rev. Letters 46, 1318 (1981); and to be published.
[2]W.G. Love and M.A. Franey, Phys. Rev. C24, 1073 (1981).
[3]W. Knupfer, M. Dillig, and A. Richter, Phys. Letters 95B, 349 (1980).
[4]C. Gaarde et al., Nucl. Phys. A369, 258 (1981).

Momentum Widths in Heavy Ion Fragmentation,* WILLIAM A. FRIEDMAN, Univ. of Wisconsin-Madison** and Mich. State Univ. The momentum distributions of projectile fragments parallel to the beam, measured in high energy reactions of ^{16}O and ^{12}C with heavy targets are analysed from a new point of view. This approach stresses the peripheral nature of these reactions. Rather than reflecting the Fermi motion explored by electron scattering, we suggest that these distributions are determined primarily by separation energies and an absorption cut-off radius. This approach accounts for the general trend with mass of the observed widths. It also provides for deviations from this trend, and it accounts naturally for the "anomalously" small widths seen recently in ^{16}O fragments from ^{20}Ne projectiles.
*Supported in part by the NSF
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A Study of Gamow Teller Strength in the ^{40,42,44,48}Ca(p,n)Reactions, J. NARAYANASWAMY,[a] S.M. AUSTIN,[a] C.C. FOSTER,[b] C. GAARDE,[c] A. GALONSKY,[a] C.D. GOODMAN,[b] K, HICKS,[d] D. HOREN,[e] P. KONCZ,[f] D. KROFCHECK,[f] J.S. LARSEN,[c] T. MASTERSON,[d] J.G. RAPAPORT,[g] E. SUGARBAKER,[f] T.N. TADDEUCCI,[g] P. WELCH[g]--We report results from a recent experiment to locate the Gamow-Teller Strength Via (p,n) reactions on ^{40,42,44,48}Ca at a proton energy of 120 MeV. This work parallels an (e,e') study of Ml strength in the same isotopes.[1] A flight path of 130 meters was used in conjunction with the neutron time of flight set up at the Indiana University Cyclotron Facility. The resulting energy resolution was about 330 keV. Measurements were made at 0°, 6° and 11°.
*Work supported by grants from the N.S.F. and D.O.E.
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[f]Ohio State University, Columbus, OH
[g]Ohio University, Athens, OH
[1]W. Steffen et al., Phys. Lett. 95B, 23 (1980).

FALL MEETING OF THE OHIO SECTION OF THE APA, OHIO UNIVERSITY, ATHENS, OHIO, 23-24 October 1981.
Giant Resonances in Nuclei, Aaron Galonsky.

NUCLEAR STRUCTURE GORDON CONFERENCE, June 1982.
What can we hope to learn from 20 to 200 MeV/Nucleon, David K. Scott.