ion paramagnetic-resonance data, give direct independent measurements of isotropic exchange parameters without the usual encumbrance of the anisotropy energy.

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DELAYED PROTONS IN THE DECAY OF Te^{108} †

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During the past year, a large number of delayed proton emitters has been found among the light elements.[1-5] A Russian group has also reported one nuclide in Kr or Br to be a delayed proton emitter,[6] but thus far no experimental data have been published for heavier elements, although Te has been considered as a promising case.[6]

In a recent study of the alpha activity of Te isotopes, a few counts that apparently did not belong to the alpha groups were observed.[7] In order to find out if they possibly were due to proton emission following beta decay of Te, a further study was undertaken.

The experimental apparatus was essentially the same as that used in a number of alpha decay studies at the Berkeley heavy-ion linear accelerator, and it has been described earlier.[8] In this work, reaction products, slowed down in the target chamber and carried into the adjacent vacuum chamber by He gas, were collected on a thin Ni or Al foil. The activity was deposited on a spot approximately 2 mm in diameter. Three millimeters behind the foil was a surface-barrier detector operating at a bias of 60 V, which is enough to stop 4-MeV protons. At this bias the positron pileup extends up to 1.5 MeV.

Tellurium isotopes were produced by the reaction $Ru^{96}(O^{16},xn)Te^{112-x}$. The targets were 1- to 2-mg/cm^2-thick 95% Ru^{96}, electroplated on 4.5-mg/cm^2-thick Cu. A set of Cu degrader foils was used to control the energy of the beam.

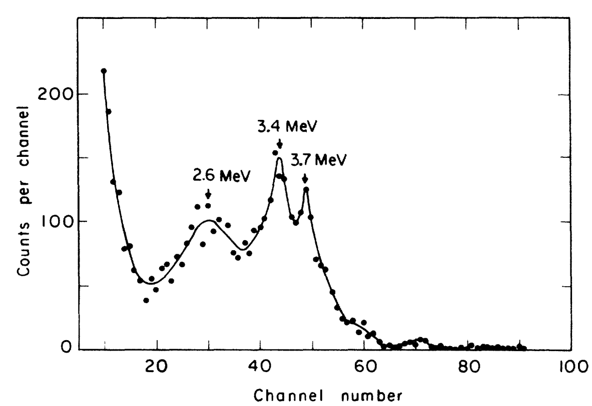

FIG. 1. Delayed proton spectrum of Te^{108}.

Figure 1 shows the spectrum taken at 85-MeV (lab) bombarding energy. In this case the collector foil was 2.2-mg/cm^2 Ni, which is thick enough to degrade 3.3-MeV alphas of Te^{107} to energies below 1.5 MeV. Three groups are present—3.7 MeV, 3.4 MeV, and a broad distribution at 2.6 MeV. The energies refer to the kinetic energy of the emitted protons with absorption in the foil taken into account, and they are estimated to be accurate to 0.1 MeV. The same spectrum was measured through 3.7- and 6.8-mg/cm^2 Al foils, and the peaks shifted downwards an amount that can be expected of proton groups with energies given above. This activity was not present when Cu was bombarded with O^{16} ions; neither was it found in $N^{14}+Ru^{96}$ bombardments.

The excitation function for this activity proved to be the same as that for the 3.08-MeV alpha activity reported in an earlier Letter.[7] Also, the half-life is the same as that of the alpha group, 5.3 ± 0.4 sec. This means that the proton activity has to be due to the same isotope, Te^{108}, which partly decays through the emission of 3.08-MeV alpha particles, and whose main decay is positron emission and electron capture to Sb^{108}.

No proton groups that could be assigned to isotopes lighter than Te^{108} were present. In the earlier work, Te^{107} was found by measuring its alpha decay,[7] but it apparently beta decays mainly to the ground state or to low-lying excited states of Sb^{107}. The proton-decay energy of these states has to be less than 2.5 MeV, otherwise they would have been seen. This indicates that the observed protons really originate from excited states of Sb^{108}, because its ground-state proton-decay energy has to be less than that of Sb^{107}. The proton binding energies of Te and Sb nuclei are not known for mass numbers less than 110, so that it is not possible to find out how highly excited the proton-emitting states are. As for the absence of isotopes lighter than Te^{107}, according to mass tables,[9] it is possible that their ground states are unstable against proton (or two-proton) emission and have half-lives considerably shorter than 0.1 sec, in which case they cannot be detected by using the present method. For Te^{108}, the mass tables predict a beta-decay energy of 7 to 8 MeV, and for Sb^{108}, a proton binding energy of ~1 MeV,[9] so that the situation is favorable for delayed proton emission.

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EXACT CALCULATION OF TRITON PARAMETERS WITH REALISTIC POTENTIALS

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We present here the results of exact calculation of the binding energy, the magnetic moment, as well as the percentage mixtures of *S*, *P*, and *D* states, for the triton looked upon as a three-body problem. This is in pursuance of the general objective set out in an earlier paper,[1] which envisaged the exact solution of a three-body problem with the help of the so-called separable potentials. The physics behind such an approach was discussed in A in the context of a bound-state problem and in a second paper[2] for the corresponding scattering problem. The physical question is, of course, whether the two-body force can be parametrized in a fairly realistic manner by a sum of several separable potentials so as to provide a detailed fit to the two-body data (for both bound and scattering states), so that a calculation of various three-body parameters with such a force may, in principle at least, offer some sort of test of its off-diagonal elements. The work of Yamaguchi[3,4] and, subsequently, by members of this group,[5-8] suggested that such a parametrization is indeed possible up to a few hundred MeV, the price being the inclusion of tensor and spin-orbit terms. For-