TABLE II. Energies of γ transitions in the spectra of Lu^{171}, Lu^{172}

No.	Energy of γ transition in kev	Identification, A	No.	Energy of γ transition in kev	Identification, A
1	(55.71)		25	(594.0)	
2	66.70	171	26	625.7	
3	72.33		27	629.6	172
4	75.85	171	28	666.9	(171)
5	78.70	172	29	(688.6)	
6	(85.55)		30	697.2	
7	90.55	172	31	712.2	171
8	91.30	171	32	739.1	171
9	112.7		33	766.7	
10	181.4	172	34	780.2	
11	203.3	172	35	809.2	172
12	269.9	172	36	838.9	171
13	279.8	172	37	(853.1)	
14	323.7	(172)	38	899.8	(172)
15	372.3		39	911.0	172
16	399.7	172	40	(927.6)	
17	410.1		41	(985.7)	
18	485.9	(171)	42	1002	172
19	490.1		43	(1020)	
20	(498.6)		44	(1071)	
21	(517.7)		45	1094	172
22	527.9	(172)	46	(1103)	
23	(535.6)		47	(1139)	
24	539.5	172			

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ON THE PENETRATING COMPONENT IN EXTENSIVE AIR SHOWERS

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In reference 1 Kazarov and Andronikashvili describe their experimental apparatus and the results obtained from their investigation of the energy spectrum of the penetrating component of extensive air showers. We give here certain additional data which, together with the results given in references 1 and 2, provide the basis for a number of conclusions.

We investigated the penetrating component at a depth of 127 m water equivalent (m.w.e.) using two detectors identical with that described in reference 1. One of the detectors was placed directly under the selecting system while the other, which had been placed at our disposal by M. F. Bibilashvili, was located 45 m from the first. The apparatus was directed in such a way that coincidences were registered between the master pulse and either of the detectors.

The data showed that out of 302 registered showers with a mean number of particles $\overline{N} = 2.85 \times 10^5$, there were 23 showers accompanied by triggering of the detector located at 45 m. We used these data to calculate the penetrating particle density ρ_μ from the formula given in reference 1. The result was $\rho_\mu = 0.077 \pm 0.018$ m^{-2}. This density refers approximately to the distance 45 to 50 m from the shower axis. Calculations yielded only a small correction to the effective distance mainly because of the angular distribution of extensive shower axes.

In their investigation of the lateral distribution of the penetrating component at 61 m.w.e. for a shower with $\overline{N} = 3 \times 10^5$ Andronikashvili and

Bibilashvili[2] obtained $\rho_\mu = 0.77 \pm 0.027$ for the penetrating component density at 45.5 m from the shower axis.

A comparison of the densities in both cases enables us to determine the exponent γ of the penetrating component energy spectrum at ~46 m from the shower axis. Assuming that

$$\rho_\mu(>E) = A(E + 1.5)^{-\gamma},$$

we obtain $\gamma = 1.15 \pm 0.41$. We note that in reference 1 for an effective distance of 28 m the energy spectrum exponent is $\gamma = 1.09 \pm 0.21$. This can serve as an indirect verification that the effective distance from the axis was obtained correctly in reference 1.

Our data also permit us to draw certain conclusions regarding the lateral distribution of the penetrating component at 127 m.w.e., at which depth we know the penetrating component density for two distances from the axis: $\rho_\mu = 0.20 \pm 0.02$ at $r = 27$ m and $\rho_\mu = 0.077 \pm 0.018$ at $r = 45$ m. Assuming that at this depth, as at 61 m.w.e.,[2] the lateral distribution obeys a law of the form $\rho_\mu(r) = a \exp[-\alpha r^2]$, we can use our data to determine the parameters a and α of this distribution. Our calculation gives $a = 0.34 \pm 0.01$ and $\alpha = 0.0074 \pm 0.00011$.

Our data give 30 ± 5 m as the half radius R of the muon distribution at 127 m.w.e. It is interesting that the data for 61 m.w.e. in reference 2 give $R = 34 \pm 3$ m.

In conclusion we wish to thank Prof E. L. Andronikashvili and M. F. Bibilashvili for their interest and for their participation in a discussion of the results.

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PECULIARITIES OF MAGNETIZATION OF THE DISORDERED Ni_3Mn *ALLOY AT LOW TEMPERATURES*

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IT is known[1] that, close to the stoichiometric composition Ni_3Mn, the Ni-Mn alloy become ordered with a sharp dependence of the physical properties on the degree of order in the arrangement of the atoms. Particularly remarkable is the appearance of strong ferromagnetism at the maximum degree of long range order. Thus, for example, the saturation magnetization I_S of the alloy exceeds the I_S of pure nickel by 50%.[2] According to the data of Kaya and Kussman,[1] Ni_3Mn in the disordered state is not ferromagnetic at room temperature. Our investigations show that it already becomes ferromagnetic at liquid nitrogen temperatures with $I_S = 1350$ Oe.

Determination of the Curie temperature was made from data of a precise measurement of the temperature dependence of the electrical resistivity. As is seen from Fig. 1 the Curie temperature Θ is equal to 110°K.

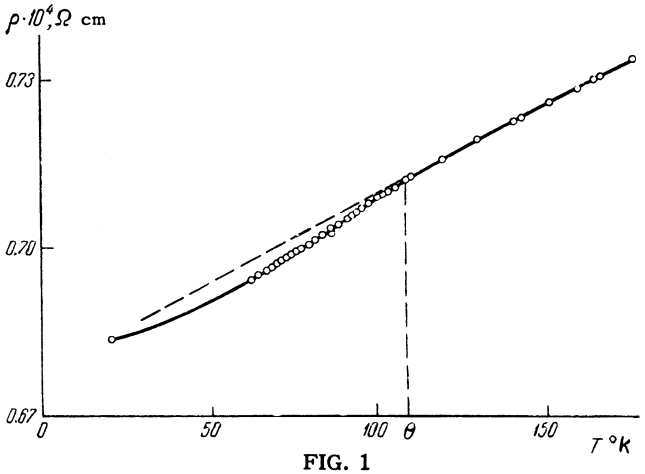

FIG. 1

A detailed examination of the magnetization curves at various temperatures down to that of liquid helium shows that the character of the magnetization has a series of peculiarities. First, the commutation magnetization curves 1a and 2a (Fig. 2), plotted at 20.4 and 4.2°K right after cooling the specimen from room temperature, run considerably below curves 1b and 2b, taken on a repeat magnetization after preliminary demagnetization by commutation from the maximum field to zero at the temperature of measurement, i.e., at 20.4