Letters to the Editor

BETA AND GAMMA SPECTRA OF Te^{117}

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AN activity with half-life T = 1.17 hours, attributed to Te^{117}, was obtained when irradiating antimony with high energy protons.[1] Some information about the gamma spectrum of Te^{117} was also obtained during investigation of Te^{115},[2] but was not published owing to its preliminary nature.

The isotope Te^{117} was identified from its daughter isotope Sb^{117} (T = 2.8 hours, $E_\gamma = 0.16$ Mev) and obtained from the reaction $Sn^{114}(\alpha, n)Te^{117}$ by irradiating in a cyclotron a target enriched in Sn^{114} (to an abundance of 57%) with alpha particles possessing an energy of about 21 Mev.

The Te^{117} was chromatographically separated from the irradiated target in an anion exchange column containing a 0.1 N solution of ammonium oxalate. The half-life of Te^{117}, measured by a scintillation spectrometer and an end-window counter, was found to be $T = 1.1 \pm 0.1$ hours.

The gamma spectrum of Te^{117} was measured on the scintillation spectrometer and the following gamma lines were found: 0.71, 0.93, 1.10, 1.27, 1.42, 1.70, 1.98, 2.3 Mev, and annihilation radiation. The total intensity of all gamma transitions is about 0.3 of the intensity of the 0.71 Mev gamma line.

The positron spectrum of Te^{117} was studied on a twin-lens spectrometer.[3] The end point of the spectrum is 1.80 ± 0.07 Mev, its Kurie plot is a straight line. Electron lines 0.690 ± 0.003 Mev and 0.719 ± 0.003 Mev were found in the conversion spectrum; these were identified as the K and L conversion lines of the 0.720 ± 0.004 Mev gamma transition. The ratio $K/L = 8.3 \pm 1.0$.

The intensity of the 0.71 Mev gamma line is approximately twice that of the annihilation radiation. If we assume on theoretical grounds that the ratio of the probability of positron decay to that of K capture is on the order of 1, then for the β^+ transition $\log \tau f = 4.3$ and we may conclude that the β^+ transition is allowed. The internal conversion coefficient for $E_\gamma = 0.72$ Mev, calculated under the assumption that the positron decay proceeds to this level, has the value $\alpha_K = 3 \times 10^{-3}$. A comparison with the theoretical value of α_K for this transition at Z = 51 allows us to conclude that the transition multipolarity is M1 or E2.

[1] Kuznetsova, Mekhedov, Rybakov, and Khalkin, Atomnaya énergiya (Atomic Energy) **4**, 583 (1958).

[2] Selinov, Vartanov, Khulelidze, Bliodze, Zaĭtsev, and Khalkin, JETP **38**, 1654 (1960), Soviet Phys. JETP **11**, 1191L (1960)

[3] Selinov, Chikhladze, Khulelidze, and Vartanov, Izv. Akad. Nauk SSSR, Ser. Fiz. **25**, 848 (1961), Columbia Tech. Transl., in press.

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POSSIBILITY OF DETECTING GRAVITATIONAL RADIATION UNDER LABORATORY CONDITIONS

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THE intensity of the gravitational radiation that arises on excitation of the characteristic longitudinal elastic vibrations in a body of cylindrical shape is relatively larger than for other macroscopic mechanical radiators.[1] If one synchronously excites the characteristic longitudinal vibration with amplitude of fractional elongation $\xi = 10^{-5}$ in $n = 2 \times 10^4$ identical cylinders of cross section $S = 10^4$ cm^2, density $\rho = 5.5$ g/cm^2, and speed of sound in the material of the cylinders $v_S = 4 \times 10^5$ cm/sec, the power loss to gravitational radiation is $\sim 10^{-25}$ w.[1,2] For this case it is necessary that the axes of the cylinders, along which the elastic vibrations are excited, be parallel, and that the cylinders be located at distances small in comparison with the wavelength of the radiation (the radiated power is proportional to n^2). The total power losses in the excitation of such a system are $\sim 10^6$ w at frequency 10^6 cps.

We note that to register or measure an electrical or mechanical signal with power 10^{-25} w