Letters to the Editor

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The Disintegration Scheme of Cs^{134}

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ELLIOTT and Bell[1] have recently published a disintegration scheme for Cs^{134} which is more complete than the one proposed originally by the present authors.[2] Some time ago we obtained results very similar to those of Elliott and Bell, and we confirm their disintegration scheme in every detail. Additional support comes from measurements of gamma-gamma coincidences, using calibrated counters.[3] The coincidence rate per recorded gamma-ray of Cs^{134} was found to be 0.96 ± 0.04 times that obtained with Co^{60}. Using the general formula for the coincidence rate in a complex decay given in reference 3 (p. 272, footnote 11) and the counter calibration curve given in the same paper, we find that the original incomplete scheme[2] predicts a ratio of 0.71 for the fractional coincidence rate in Cs^{134} to that in Co^{60}, in disagreement with experiment. Assuming the new scheme, on the other hand, we can use the general formula to calculate, from the observed coincidence rate, the fraction of the disintegrations leading to the 1.97-Mev level in Ba^{134}. The result is 0.26 ± 0.08 in excellent agreement with the value proposed by Elliott and Bell from spectrometer measurements. From absorption measurements using a windowless counter, we estimate the abundance of the very soft beta-ray spectrum at 0.32 ± 0.08, again consistent with the other determinations. Failure to resolve the 0.57-Mev gamma-ray in our early measurements was apparently due to a slight error in alignment of the spectrometer at that time which also seems to have caused a minor shift in the energy calibration. Our best values for the gamma-ray energies are now 0.566 ± 0.01 Mev, 0.603 ± 0.01 Mev, and 0.798 ± 0.015 Mev, based on the photoelectron energies from a thin uranium radiator. These values are just outside our earlier probable errors but well within the combined errors of the two determinations. The energy of the 1.35-Mev gamma-ray is still too uncertain to permit definite assignment to one or the other of the two possible "cross-over" transitions. Internal conversion electrons have been observed in the beta-ray spectrometer. There is about 4.4×10^{-3} conversion electron per disintegration due to the 0.57-Mev and the 0.60-Mev gamma-ray combined and about 2.4×10^{-3} due to the 0.798-Mev gamma-ray. Comparison with the conversion coefficients observed for the gamma-rays of I^{130} (reference 3, Fig. 4B; the ordinates in this figure should be labeled 10^{-2}, not 10^{-3}) makes it appear probable that the multipole nature of the Cs^{134} gamma-rays is the same as that of the I^{130} gamma-rays. A search for Xe K-x-rays, using a krypton-filled counter, yielded negative results. This places an upper limit of 5 percent on the K electron capture by Cs^{134}.

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1 L. G. Elliott and R. E. Bell, Phys. Rev. **72**, 979 (1947).
2 K. Siegbahn and M. Deutsch, Phys. Rev. **71**, 483 (1947).
3 A. Roberts, L. G. Elliott, J. R. Downing, W. C. Peacock, and M. Deutsch, Phys. Rev. **64**, 268 (1943).

Constant Temperature Operation of the Hot Wire Anemometer at High Frequencies

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APPLICATION of the constant temperature hot wire anemometer to turbulence measurements presupposes successful design of an electronic amplifier for the instrument. The difficulty encountered has been spontaneous oscillation in the over-all system. From wire parameters, a "dynamic transresistance" is calculated for the wire in the bridge and inserted in the loop feed-back equation. Stability criteria then dictate a minimum allowable frequency range for the amplifier alone which depends on wire parameters and amplifier transconductance.

For a particular wire and a chosen anemometer frequency range the table shows the necessary amplifier transconductance and frequency range.

Instrument range kc	Amplifier g Mho	Amplifier range kc	% Turbulence constant temperature	% Turbulence constant current
31	20	110	0.5	0.0055
78	50	270	0.20	0.022
160	100	540	0.56	0.062

Besides increasing the difficulties of bridge and amplifier design, this comparatively wide frequency range emphasizes the problem of noise. Column 4 shows the percent turbulence whose signal equals the thermal noise voltage in the system arising from the wire. For comparison, column 5 shows the corresponding percent turbulence in an ideal constant current instrument. A more detailed account of this work will probably be published at a later date.

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** This communication was submitted to the American Physical Society as an abstract for the New York meeting, but because of an oversight it was not included in the bulletin for that meeting.