Energies and intensities of weak transitions in the decay of ^{132}I

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The γ-ray spectrum of a ^{132}Te-^{132}I equilibrium source was measured with an 18% efficiency Ge(Li) detector to search for weak transitions in the ^{132}I decay. A more detailed study was made of an earlier spectrum taken with a Compton suppression system and a chemically purified source. The results are compared with all available data and average values of the energies and intensities are given.

[RADIOACTIVITY ^{132}I separated and from ^{132}Te; measured E_γ, I_γ deduced levels.]

From γ-γ coincidence studies of the decay of ^{132}I, 113 of the 119 definitely established γ rays were placed in the ^{132}Xe level scheme.[1] Many additional weak transitions have been reported[2] in the decay of ^{132}I. Most of these were unknown to us at the time of the coincidence studies.[1] To help clarify the decay scheme of ^{132}Xe, the γ-ray spectrum of ^{132}I was carefully studied with a commerically prepared equilibrium source of ^{132}Te-^{132}I to search for these weak transitions. In the present work, a closer examination also was made of a γ-ray spectrum of a chemically separated ^{132}I source recorded on a Compton suppression system. This work was part of two senior honors theses.[3,4] Our results are compared with previous reports[1,2,5] and new averages are presented. Some of the weak transitions fit energetically into the established levels[1] of ^{132}Xe. One new level at 3084.4 keV is suggested by energy sums.

γ-ray singles data were taken with a commercially prepared $^{132}Te \rightarrow {}^{132}I$ equilibrium source with an 18% efficiency Ge(Li) detector (40:1 peak to Compton ratio) coupled to a Nuclear Data ND 4420. Two sets of 0 to 3 MeV, 4096 channel singles data were taken in a copper, cadmium lined lead cave, one without and one with a 1.2 cm thick Pb absorber in front of the detector to reduce the count rate and so improve the resolution and to enhance the higher energy region. From a background run, only the 609.3 and 2204.2 keV γ rays which are presumably from the ^{214}Bi decay were found to be non-negligible.

The energy and intensity calibrations were done by using the energies and intensities[5] of the strong γ rays in the ^{132}I decay. An emphasis was placed on examining regions where new γ rays were reported[2] or where there were disagreements.[2,5] The areas of the new weak peaks were analyzed by hand.

A new analysis to obtain intensities of the weak γ rays was also carried out on the spectrum of a chemically separated ^{132}I source taken with a Compton suppression system. Some energies from that spectrum have been reported earlier.[5] The absence of an intensity in Table I in the Livermore or Vanderbilt data means that this peak was not analyzed because the γ ray is well established, it was not visible in the spectra, or an impurity line masked the line.

The energies and intensities of the weak γ rays observed in our work are given in Table I along with the results of Weiss[2] and Carter *et al.*[5] (average values), and the intensities from the coincidence work of Singhal *et al.*[1] A new set of average energies and intensities in the decay of ^{132}I to ^{132}Xe is given in Table I.

Weiss[2] indicated that nineteen of the transitions she reported may be spurious as indicated in Table I. Comparisons of the values suggest that some of the previously reported transitions do not exist. In some cases, our intensities are well above previous reports[2,5] to suggest that these γ rays may arise from common isotopic contaminents. Of course, weak transitions of the same energy are not excluded.

Since isotopic contaminants may have been present in the commerical Vanderbilt source, the

TABLE I. Energies and intensities of γ rays observed in sources of $^{132}Te - {}^{132}I$ at Vanderbilt and from chemically separated sources of ^{132}I at Livermore and in the work of Carter *et al.* (Ref. 5) and Weiss (Ref. 2). The errors in the I_γ values from Vanderbilt and Livermore are essentially the same.

E_γ (keV)				I_γ				
Carter Avg.	Weiss	Present	Adopted Avg. En.	Carter Avg.	Weiss	Livermore	Vanderbilt	Adopted
136.6(5)	136.8(5)		136.7(4)	0.08(1)	0.09	0.08		0.08(1)
147.2(1)	147.9(4)		147.4(1)	0.24(2)	0.23			0.24(2)
183.3(3)	184.1(5)		183.6(3)	0.16(3)	0.11	0.14	0.14(2)	0.14(2)
	194.3(5)		194.3(5)[a]		0.09	≤0.08	≤0.08	[a]
	234.3(6)[b]	234	234.3(6)[b]		0.04	0.03	≤0.03	0.03(1)
	241.2(5)	240.7(8)	[c]		0.05	0.04	0.25(2)	[c]
	251.0(7)[b]	250.6(8)	250.8(6)[b]		0.017	0.018	≤0.02	0.018(5)
254.8(2)	255.5(3)		255.1(2)	0.19(3)	0.25	0.26		0.24(2)
262.7(1)	263.5(4)		262.9(1)	1.46(9)	1.0			1.30(10)
278.9(4)		277.5(7)	278.4(4)	0.04(2)		0.02	0.05(2)	0.04(1)
284.8(1)	285.2(4)		284.9(1)	0.80(7)	0.44		0.73(7)	0.72(7)
	296.5(6)[b]		296.5(6)[a,b]		~0.016	≤0.01	≤0.02	[a]
	302.0(7)[b]		302.0(7)[a,b]		~0.005	≤0.02	≤0.02	[a]
306.6(4)	307.0(6)		306.7(4)	0.11(4)	0.1	0.10	0.10(3)	0.10(2)
310.0(4)	310.3(6)		310.1(4)	0.09(4)	0.09	0.09	0.10(3)	0.09(2)
316.5(4)	317.0(6)		316.7(4)	0.16(4)	0.1	0.13	0.14(3)	0.13(2)
343.6(4)	343.9(6)		343.7(4)	0.10(2)	0.09	0.08	0.10(3)	0.09(2)
	355.8(6)[b]	354.9(4)[d]	355.2(4)[b]		0.05	0.05	0.04(2)	0.05(2)
363.5(4)			363.5(4)	0.5(1)				0.5(1)
	376.7(5)	376.6(4)	376.6(4)		0.03	≤0.01	0.01(5)	0.010(5)
387.8(4)	388.0(4)		387.9(3)	0.17(3)[e]	0.3	0.34	0.30(5)	0.30(5)
	402.6(6)[b]		402.6(6)[a,b]		0.023	≤0.015	≤0.02	[a]
416.8(4)	416.8(4)		416.8(3)	0.47(9)	0.46	0.43	0.53(6)	0.48(5)
431.9(4)	431.7(4)		431.8(3)	0.46(9)	0.48	0.43	0.55(6)	0.48(5)
	445.0(6)		445.0(6)[a]		0.1	≤0.1	≤0.1	[a]
446.0(4)	446.4(4)		446.2(3)	0.68(8)	0.55	0.61	0.60(6)	0.61(5)
473.4(7)	473.9(6)		473.6(4)	0.27(5)	0.17	~0.15	0.18(4)	0.17(4)
477.9(7)	478.5(6)		478.2(4)	0.10(4)	0.24	0.20	0.15(5)	0.17(4)
487.5(7)	488.2(4)	488.0(6)	488.0(4)	0.18(5)[e]	0.41	0.40	0.44(6)	0.42(5)
505.90(13)	505.9(3)		505.90(13)	5.1(2)	4.9			5.0
522.65(9)	522.7(3)		522.65(9)	16.3(6)	16			16.2(5)
535.5(4)	535.3(4)		535.4(3)	0.53(8)	0.47	0.57	0.49(5)	0.52(5)
	540.0(6)[b]	539.4(6)	539.7(4)[b]		0.11	0.12	0.11(2)	0.11(2)
547.1(2)	547.3(4)		547.2(2)	1.27(9)	1.0			1.15(8)
	559.5(6)	559.8(4)	559.7(4)		0.09	0.10	0.07(2)	0.09(2)
	572.0(6)	572.9(4)	572.5(4)		0.037	0.06	0.07(2)	0.06(2)
590.9(20)	591.1(6)		591.1(6)	0.06(4)	0.07	0.09	0.05(3)	0.07(2)
600.5(20)	600.0(6)		600.0(6)	0.09(3)	0.15	0.15	0.14(3)	0.13(3)
	609.5(6)	610.0(6)	609.8(5)[f]		0.04	0.04	0.04(2)	0.04(1)[f]
621.0(2)	620.8(3)	{620.8(3)[g]	620.9(2)	2.0(1)	2.0		{0.4(2)[g]	0.4(2)
		621.2(3)[g]}	621.2(3)				1.6(2)[g]}	1.6(2)
630.22(9)	630.0(3)		630.22(9)	13.9(6)	13			13.5(4)
	642.4(5)	642.0(6)	642.2(4)[a]		0.035	≤0.04	≤0.04	[a]
650.6(2)	650.3(3)		650.5(2)	2.7(2)	2.5			2.6(2)
659.0		659.0(7)	[h]			0.36	≤0.2	[h]
667.69(8)	667.3(3)		667.69(8)	100	100	100	100	100
669.8(3)	669.7(3)		669.8(2)	5.0(8)	4.4			4.7(6)
671.6(3)	671.3(3)		671.4(2)	5.3(4)	4.4			3.5(10)
	684.1(5)	684.6(2)	[c]		0.03	0.05	0.16	[c]
	687.9(5)	687.6(7)	687.8(5)		0.04	0.03	0.05(2)	0.04(2)
	706.4(7)	706	706.4(7)		0.02	0.02	≤0.02	0.02
727.1(2)	726.7(3)	{727.0(3)[g]	727.0(3)				{3.2(6)[g]	3.2(6)
		727.2(3)[g]}	727.2(3)	6.6(3)	5.5		2.2(6)[g]}	2.2(6)
	728.1(5)	728.5(2)[g]	728.4(2)		2.2		1.1(3)[g]	1.6(4)
772.61(8)	772.3(3)		772.61(8)	77.2(18)	76			76.6(13)

TABLE I. (*Continued*)

Carter	E_γ (keV)		Adopted	Carter		I_γ		
Avg.	Weiss	Present	Avg. En.	Avg.	Weiss	Livermore	Vanderbilt	Adopted
780.2(3)	779.8(3)		780.0(2)	1.25(6)	1.2	1.3	1.10(8)	1.20(4)
784.5(4)	784.4(4)		784.4(4)	0.43(5)	0.4	0.4	0.31	0.39(4)
792.1(10)	791.0(4)		791.2(4)	0.09(3)	0.11	0.09		0.10(2)
809.8(2)	809.2(3)		809.5(2)	2.9(3)	2.4			2.6(3)
812.2(2)	811.8(3)		812.0(2)	5.7(5)	5.5			5.6(4)
	831.2(7)[b]	831.4(5)	831.3(5)[b]		0.02	0.02	0.03(1)	0.025(10)
	848.0(7)[b]	847.8(6)	847.9(5)		0.014	0.02	0.020(6)	0.017(5)
863.3(2)	862.7(4)		863.0(2)	0.60(5)	0.54	0.59	0.54(4)	0.57(3)
	866.1(7)	866.0(6)	866.0(6)		0.034	0.04	0.04(2)	0.036(14)
876.8(2)	876.3(4)		876.6(2)	1.09(5)	1.0			1.05(4)
	885.7(6)	886.5(6)[b]	886.1(5)		0.02	0.02	0.03(1)	0.025(8)
889.0(20)	888.4(6)	889.0(6)	888.7(5)	0.04(3)	0.04	0.04	0.03(1)	0.035(8)
	904.3(7)[b]	904.5(6)	904.4(5)[b]		0.014	$\lesssim$0.015	0.012(6)	0.013(4)
910.3(2)	909.8(3)		910.1(2)	0.93(5)	1.0	0.92	0.93(4)	0.94(3)
927.6(3)	927.1(4)		927.4(3)	0.45(8)	0.4	0.43	0.41(4)	0.42(4)
948.6(20)	947.0(6)		947.2(6)	0.08(5)	0.034	0.06	0.04(2)	0.045(14)
954.55(9)	953.9(3)		954.55(9)	18.3(6)	17			17.8(5)
	965.4(6)	966.2(7)	965.8(5)		0.02	0.04	0.04(1)	0.035(8)
984.5(2)	983.7(4)		984.2(2)	0.57(6)	0.64	0.57	0.60(5)	0.60(4)
	995.3(6)	996.2	995.8(5)		0.03	≤0.02	0.04(1)	0.03(1)
1002.1	1003.1(7)	1002.4(7)	1002.5(6)		0.024	0.03	0.03(1)	0.026(7)
	1005.9(7)[b]	1004.8(8)	1005.4(6)[b]		0.017	0.02	0.015(6)	0.016(5)
1009.8	1008.8(7)	1008.7(5)	1009.0(4)		0.044	0.05	0.05(1)	0.047(7)
1016.2(20)			[c]	0.05(3)		<0.01	≤0.006	[c]
1034.7(2)	1035.4(4)		1035.0(2)	0.58	0.55	0.48	0.47(7)	0.52(5)
	1045.1(7)[b]		1045.1(7)[b]		0.007	<0.01	≤0.005	[a]
1049.9(7)	1049.3(4)		1049.6(4)	0.045(15)	0.05			0.047(12)
1065.5(7)			[c]	0.034(11)		<0.015	≤0.010	[c]
	1081.6(7)	1082.0(5)	1081.8(4)		0.025	0.04	0.04(1)	0.035(8)
1086.3(10)	1086.2(4)		1086.2(4)	0.070(30)	0.09	0.06	0.08(2)	0.08(2)
1096.8(7)	1096.9(5)		1096.9(4)	0.035(12)	0.045	0.05	0.049(10)	0.045(8)
1112.5(4)	1112.3(5)		1112.4(3)	0.063(21)	0.065	0.06	0.077(15)	0.066(15)
1126.6(7)	1126.4(5)		1126.5(4)	0.052(24)	0.05	0.05		0.05(2)
1136.03(12)	1135.4(3)		1136.03(12)	3.0(2)	3.1			3.05(14)
1143.4(2)	1143.0(4)		1143.3(2)	1.4(1)	1.3	1.35	1.39(7)	1.37(6)
1148.2(7)	1147.4(6)		1147.8(5)	0.21(5)	0.33	0.28	0.33(7)	0.27(5)
1173.2(2)	1172.6(3)		1172.9(2)	1.1(1)	1.1			1.10(7)
	1206.7(6)[b]	1206.7(2)	[c,b]		0.017	≤0.015	0.12	[c]
	1211.8(6)[b]	1212.7(4)	1212.3(4)[b]		0.016	≤0.015	0.011(3)	0.012(3)
	1242.6(7)[b]	1243	1242.6(7)[a,b]		0.012	≤0.015	≤0.009	[a]
1254.1(5)	1254.1(6)		1254.1(4)	0.046(23)	0.07	0.066	0.050(8)	0.060(7)
1263.7(7)	1263.5(6)		1263.6(5)	0.023(12)	0.03	0.033	0.021(7)	0.027(6)
1272.7(4)	1272.8(6)		1272.8(4)	0.15(3)	0.17	0.20	0.16(3)	0.17(2)
1290.7(3)	1290.8(3)		1290.8(2)	1.15(6)	1.1			1.14(5)
1295.3(3)	1294.9(3)		1295.1(2)	2.0(1)	1.8			1.90(7)
1298.2(5)	1297.6(4)		1297.9(4)	0.9(1)	0.77	0.9	1.0(1)	0.90(7)
1314.3(7)	1313.8(6)		1314.05	0.060(20)	0.057	0.060	0.062(10)	0.060(9)
1317.1(7)	1317.2(6)		1317.2(5)	0.12(2)	0.11	0.13	0.11(3)	0.120(15)
	1359.5(7)	1360.6(7)	1360.0(5)		$\sim$0.005	≤0.02	0.007(3)	0.006(2)
1372.07(13)	1372.0(3)		1372.07(13)	2.5(1)	2.4			2.5(1)
1392.5(20)	1390.6(6)	1390.7(7)	[c]	0.24(15)	0.01	0.07	0.015(10)	[c]
1398.57(10)	1398.6(3)		1398.57(10)	7.2(3)	6.9			7.1(2)
1410.5(4)		1410.8(4)	1410.6(3)	0.06(2)		0.04	0.040(8)	0.044(7)
1442.56(10)	1442.4(3)		1442.56(10)	1.44(6)	1.4			1.42(5)
	1450.1(7)[b]	1450.0(7)	1450.0(5)		0.01	0.01	0.006(3)	0.008(2)
1456.5(2)	1456.4(6)		1456.5(2)	0.049(10)	0.05	0.063	0.037(10)	0.050(7)
1476.8(2)	1476.5(6)		1476.7(2)	0.14(2)	0.13	0.127	0.137(12)	0.132(9)

TABLE I. (*Continued*)

Carter Avg.	E_γ (keV) Weiss	Present	Adopted Avg. En.	I_γ Carter Avg.	Weiss	Livermore	Vanderbilt	Adopted
1503.6(6)			[c]	0.009		≤0.005	≤0.003	[c]
1519.7(2)	1519.5(6)		1519.6(2)	0.075(8)[i]	0.085	0.078	0.082(8)	0.080(5)
	1531.8(7)	1532.0(7)	1531.9(5)		~0.007	0.016	0.006(2)	0.006(2)[h]
1542.2(10)	1542.3(7)		1542.3(6)	0.010(5)	0.018	0.014	0.017(3)	0.016(2)
	1559.2(7)	1558.9(4)	1559.0(4)		0.010	~0.007	0.011(3)	0.009(2)
1593.1(3)	1592.6(6)		1592.9(3)	0.045(6)	0.058	0.042	0.048(5)	0.048(4)
		1617.9(2)[j]	1617.9(2)				0.010(5)[j]	0.010(5)
1620.6(7)	1620.6(7)	1618.9(3)[j]	1618.9(3)	0.030(6)	0.02		0.007(5)[j]	0.007(5)
1637.8(7)	1636.3(7)	1637.7(11)	1636.5(6)	0.017(4)	0.012		0.013(5)	0.012(4)
	1639.2(7)	1639.0(7)	1639.1(5)		~0.009		0.007(3)	0.008(2)
	1643.5(7)	1644.5(7)	1644.0(6)		0.012		0.014(6)	0.013(4)
1661.6(7)	1661.2(7)		1661.4(5)	0.017(4)	0.017		0.013(5)	0.016(3)
	1671.0(7)	1671.5(4)	1671.3(4)		0.02	0.025	0.018(5)	0.022(4)
	1679.4(8)	1679.2(7)	1679.3(6)		~0.005	≤0.008	0.006(2)	0.006(2)
1715.5(5)	1715.2(7)		1715.4(4)	0.053(5)	0.04	0.055	0.058(6)	0.056(4)
1720.8(6)	1720.3(7)		1720.6(5)	0.056(5)	0.05	0.053	0.056(6)	0.055(4)
1727.3(5)	1727.2(6)		1727.2(4)	0.063(9)	0.05	0.060	0.076(8)	0.068(6)
1738.0				<0.018		<0.007	<0.004	[a]
1747.0				<0.018		<0.006	<0.004	[a]
	1752.3(7)	1752.2(8)	1752.3(7)		0.03	0.03	0.020(10)	0.025(8)
1757.5(2)	1757.2(6)		1757.4(2)	0.38(3)	0.27	0.30	0.27(3)	0.30(3)
1759.1(8)	1760.5(6)	1761.0(10)	1760.4(6)		0.08	0.04	0.05(2)	0.06(2)
		1768.5(8)	1768.5(8)			0.03	0.02(1)	0.025(8)
1778.4(5)	1778.5(6)		1778.5(4)	0.060(15)	0.07	0.10	0.080(10)	0.080(8)
1786.8(10)	1786.2(9)		1786.5(6)	0.008(4)	0.01	0.011	0.012(3)	0.011(2)
1803				<0.002		<0.003	<0.001	[a]
1814.4(7)	1813.7(8)		1814.0(5)	0.010(4)	0.014	0.019	0.018(5)	0.016(4)
1830.0(7)	1830.2(8)		1830.1(5)	0.029(9)	0.025	0.031	0.027(7)	0.028(5)
1879.2(7)	1879.3(8)		1879.2(5)	0.016(3)	0.015	0.009	0.016(4)	0.014(3)
1914.3(7)	1913.1(8)		1913.7(5)	0.06(5)	0.01	0.03		0.03(1)
1921.08(12)	1920.9(5)		1921.08(12)	1.20(9)	1.3			1.25(6)
	1925.7(10)[b]	1925.7	1925.7(10)[b]		~0.001		0.002(1)	0.002(1)
	1939.6(9)	1939.4(10)	1939.5(7)		~0.003	0.008	0.005(2)	0.005(2)
1985.5(15)	1985.7(8)		1985.6(7)	0.008(2)	0.01	0.015	0.012(2)	0.012(2)
2002.3(12)	2002.2(5)		2002.2(5)	1.1(1)	1.2			1.15(8)
2086.82(15)	2086.6(5)		2086.82(15)	0.25(4)	0.28	0.23	0.25(2)	0.26(2)
2172.68(15)	2172.5(5)		2172.68(15)	0.19(3)	0.24	0.21	0.20(2)	0.21(2)
2186.9(20)	2187.0(7)		2187.0(6)	0.007(3)	0.01		0.006(2)	0.007(3)
2204.1(10)		2204.2(7)	2204.2(6)[k]	<0.002		≤0.004	0.003(2)	0.003(2)[k]
2223.17(15)	2222.9(6)		2223.17(15)	0.12(2)	0.12	0.11	0.12(2)	0.12(2)
2249.1(3)	2249.0(6)		2249.1(3)	0.03(1)	0.034	0.035	0.034(3)	0.034(2)
2290.4(13)	2290.8(8)	2290.4(8)	2290.6(6)	0.017(5)	0.004	~0.005	0.0035(8)	0.0036(8)
	2304.4(8)[b]	2305.5(7)	[c,b]		~0.015	<0.003	0.0018(6)	[c]
2390.48(15)	2390.3(5)		2390.48(15)	0.17(2)	0.21			0.19(2)
2408.9(6)	2408.4(6)		2408.6(4)	0.010(3)	0.01	0.008	0.010(1)	0.0095(8)
	2416.0(8)[b]	2417.1(4)	[c,b]		0.01	<0.0015	0.0014(6)	[c]
2446	2444.0(6)		2444.0(6)	0.005(2)	0.006	~0.005	0.0057(8)	0.0057(8)
2455.2(6)	2454.3(7)		2454.8(4)	0.003(2)	0.003		0.0021(5)	0.0021(5)
2487	2488.0(7)	2487.5(11)	2487.8(6)	<0.002	0.001		0.0007(3)	0.0008(2)
2525.14(15)	2525.1(6)		2525.14(15)	0.037(7)	0.05	0.041	0.040(5)	0.040(4)
2546.6(15)	2546.4(7)		2546.5(6)	0.002(1)	0.002	~0.002	0.0015(5)	0.0016(5)
2569.7(6)	2569.8(6)		2569.8(4)	0.003(1)	0.006	0.006	0.005(1)	0.005(1)
2591(3)	2594.6(7)	2593.0(8)	2593.8(8)	<0.0005	~0.0015		0.0009(3)	0.0012(3)
	2602.9(7)	2603.6(7)	2603.2(5)		~0.002		0.0012(4)	0.0015(3)
	2607.0(8)	2607.4(7)	2607.2(6)		~0.001		0.0010(4)	0.0010(3)
2614.8(7)		2614.4(4)	[l]	<0.006			0.0036(12)	[l]
2652	2654.1(9)	2653.7(7)	2653.8(6)	<0.0005	~0.001		0.0010(4)	0.0010(3)

TABLE I. (*Continued*)

Carter Avg.	E_γ (keV) Weiss	Present	Adopted Avg. En.	Carter Avg.	Weiss	I_γ Livermore	Vanderbilt	Adopted
2690	2691.3(9)	2690.2(11)	2690.8(7)	<0.0005	∼0.001		0.0010(4)	0.0010(3)
2717.8(30)	2717.5(6)		2717.5(6)	0.003(1)	∼0.004	∼0.003	0.0035(5)	0.0035(5)
	2757.9(8)	2757.6(11)	2757.8(7)		∼0.0005		0.0013(6)	0.0009(4)
2764(4)	2766.1(8)		a	<0.001	0.0004		<0.0004	a

[a] Those γ rays which are not seen in our data are considered tentative. Transitions with intensities below our limits of course are still possible.

[b] Weiss (Ref. 2) considered these transitions as doubtful in the ^{132}I decay.

[c] Intensities reported by two groups that differ by a factor of 3 or more clearly indicate contamination. The corresponding transitions in ^{132}I decay are doubtful.

[d] The 351.8 keV line of Carter *et al.* (Ref. 5) is either an energy error or may be from the ^{214}Bi decay.

[e] This intensity was obtained by subtracting an impurity γ ray of the same energy that was not present in the other studies. This may be the source of the difference in the intensities.

[f] This γ ray at 609.3 keV may be the well known, strong transition of this energy in the ^{214}Bi decay.

[g] Established by the coincidence data of Singhal *et al.* (Ref. 1).

[h] While difference in intensities could indicate a contamination, here too, the difference is not as large as found for other γ rays, and may simply reflect experimental errors.

[i] The intensity of Carter *et al.* (Ref. 5) is given and not their average.

[j] The two transitions are based on the coincidence data of Singhal *et al.* but the transition energies here are based on energy level differences. Singhal *et al.* (Ref. 1) assigned most of the intensity at this energy to an impurity line at 1621 keV although it could be that this additional transition belongs in the ^{132}I decay. The coincidence data indicate that the 1617.9 keV transition is stronger but it is difficult to obtain absolute values because of the somewhat stronger 1621 keV line.

[k] Probably from ^{214}Bi. The intensity is what would be expected for a γ ray in the ^{214}Bi decay if the observed 609.3 keV transition belongs there.

[l] This could be in ^{208}Pb.

agreement between these results and those of Weiss[2] or Carter *et al.*[5] for the weak transitions does not definitely establish them as belonging to the ^{132}I decay. It was therefore very useful to confirm a γ-ray transition in the Compton suppressed spectrum taken with a chemically purified ^{132}I source. For the 2593.8, 2653.8, and 2690.8 keV transitions, the lower limts of Carter *et al.*[5] are a factor of 2 below our new values. In these three cases we conclude that the intensity limits of Carter *et al.*[5] and/or our intensities, which overlap those of Carter *et al.*[5] within 2σ, are sufficiently close within the uncertainties in both that these differences are not significant.

Thirteen of the new weak transitions fit between established energy levels in ^{132}Xe, see Table I. The energy agreement for the two highest energy transitions is not good. It is possible that the energy calibration in this high energy region may be off more than indicated by the assigned errors, however, there is agreement for the only slightly lower 2487.8 keV transition. From energy sums one could suggest one additional level at 3084.4(4) keV based on the following sums:

$$667.7 + 2416.9(4) = 3084.6(4),\quad 1297.8 + 1786.5(6) = 3084.3(6),\ \text{and}\ 1440.3 + 1644.0 = 3084.3(6).$$

Transitions with the following energies can fit between the known levels as shown with energies in keV:

355.2-2394.9 to 2040.6 or 3192.8 to 2838.7; 539.7-2890.7 to 2350.7 or 3122.9 to 2583.8; 559.7-2670.0 to 2110.2; 572.5-2613.5 to 2040.6; 831.3-3226.8 to 2394.9; 965.8-2959.1 to 1962.9; 1005.4-3192.8 to 2187.4; 1001.8-3122.3 to 2040.6 or 3192.8 to 2110.2; 1671.3-3112.1 to 1440.3; 2487.8-3158.4 to 667.7; 2593.8-3260.0 to 667.7, and 2653.8-3319.6 to 667.7.

Since ^{132}Te-^{132}I generators are easily available commercially, the energies and intensities of transitions in the decay of ^{132}I as given in Table I may be useful standards for calibrating Ge(Li) detector systems in many situations.

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