Effect of Cellular Geometry on *S*-values

The greatest differences in *S*-values were noted in smaller R_C and R_N configurations. In Supplemental Figure 1 (for the case R_C = 5 μm and R_N = 2 μm), the contribution of eccentricity due to cytoplasmic activity varied to a maximum of 30% for all radionuclides considered, with the least effect noted for ^{123}I and ^{125}I (i.e. less than 15% decrease to nucleus dose). However, dose to the nucleus due to cell surface distributed activity was greatly affected by eccentricity. The greatest increase was noted for ^{67}Ga (4 fold increase) and ^{201}Tl (2 fold increase), with nucleus dose for ^{111}In and ^{119}Sb not affected by eccentricity ($S_{ecc}/S_{conc} \approx 1$).

As illustration of the potential effect that eccentricity could have on dose calculations, a hypothetical case is presented based on experimental internalization data for internalizing and non-internalizing radionuclides (*2-4*). *S*-values for a cell with dimension R_C = 10 μm and R_N = 5 μm were used (Supplemental Tables 2-13). Arbitrary activity was distributed 1) exclusively on the membrane with no internalisation, 2) uniformly throughout the cell, 3) uniformly on the cell membrane and cytoplasm and 4) uniformly throughout the cytoplasm with minimal membrane distribution. Using the MIRD formalism, the absorbed dose (D_T) in a target region T is calculated from the cumulated activity $\tilde{A}_S$ in one or more source regions S;

$$D_{\mathrm{T}} = \sum_{\mathrm{S}} \tilde{A}_{\mathrm{S}} \times S(\mathrm{T} \leftarrow \mathrm{S}) \qquad \text{Eq. 1}$$

The dose to the nucleus is calculated for concentric and eccentric cell/nucleus configurations and the dose fraction D_{ecc}/D_{conc} is taken as the ratio of dose to the nucleus in an eccentric cell compared with a concentric cell (Supplemental Figure 3). Eccentricity had the greatest effect on nucleus dose calculations when the activity was distributed on the cell surface, with the largest result seen for ^{89}Zr. Uniform distributed activity had the least effect on dose calculations, while activity distributed in the cytoplasm with minimal membrane distribution could lead to an underestimation of dose in cells with eccentric cell arrangements. To summarise, MIRD *S*-values for concentric cells underestimate the dose to the nucleus from membrane bound radionuclides when the nucleus abuts the cell membrane (i.e. eccentric cell/nucleus arrangement). In contrast, when the activity is uniformly distributed throughout the cytoplasm, MIRD *S*-values for concentric cells overestimate the nuclear dose in eccentric cells. Bearing in mind that Pouget et al (*4*) noted that membrane bound AE emitting radionuclides can be as cytotoxic as nuclear incorporated AE emitters, it thus follows that for cells with an eccentric cell/nucleus arrangement where the nucleus abuts the cell membrane, an AE emitting theranostic that is membrane bound would have the potential to deposit a substantial dose to the nucleus that could lead to a pronounced biological effect when compared with concentric cells. However, it should be clear that the dose distribution in the eccentric cell/nucleus arrangement would be nonuniform; i.e., a small portion of the nucleus may be irradiated and the remainder left untouched. An in vitro experimental approach would be required to test this observation.

Evaluation of DPKs – Contribution of β spectrum in comparison to the Auger, Coster-Kronig, conversion electron (AE+CK+IE) spectrum

Dose deposition from an isotropic point source was calculated in 1 nm radial bins up to 50 µm. In the case of ^{89}Zr, the β spectrum contribution to the total dose deposited exceeds that of the contribution of the AE+CK+IE spectrum at a radial distance of 4.8 µm (Supplemental Figure 4). In contrast, for ^{90}Nb, the contributions from the β and AE+CK+IE spectra approaches equivalence at a distance approximately 6.0 µm from the point source.

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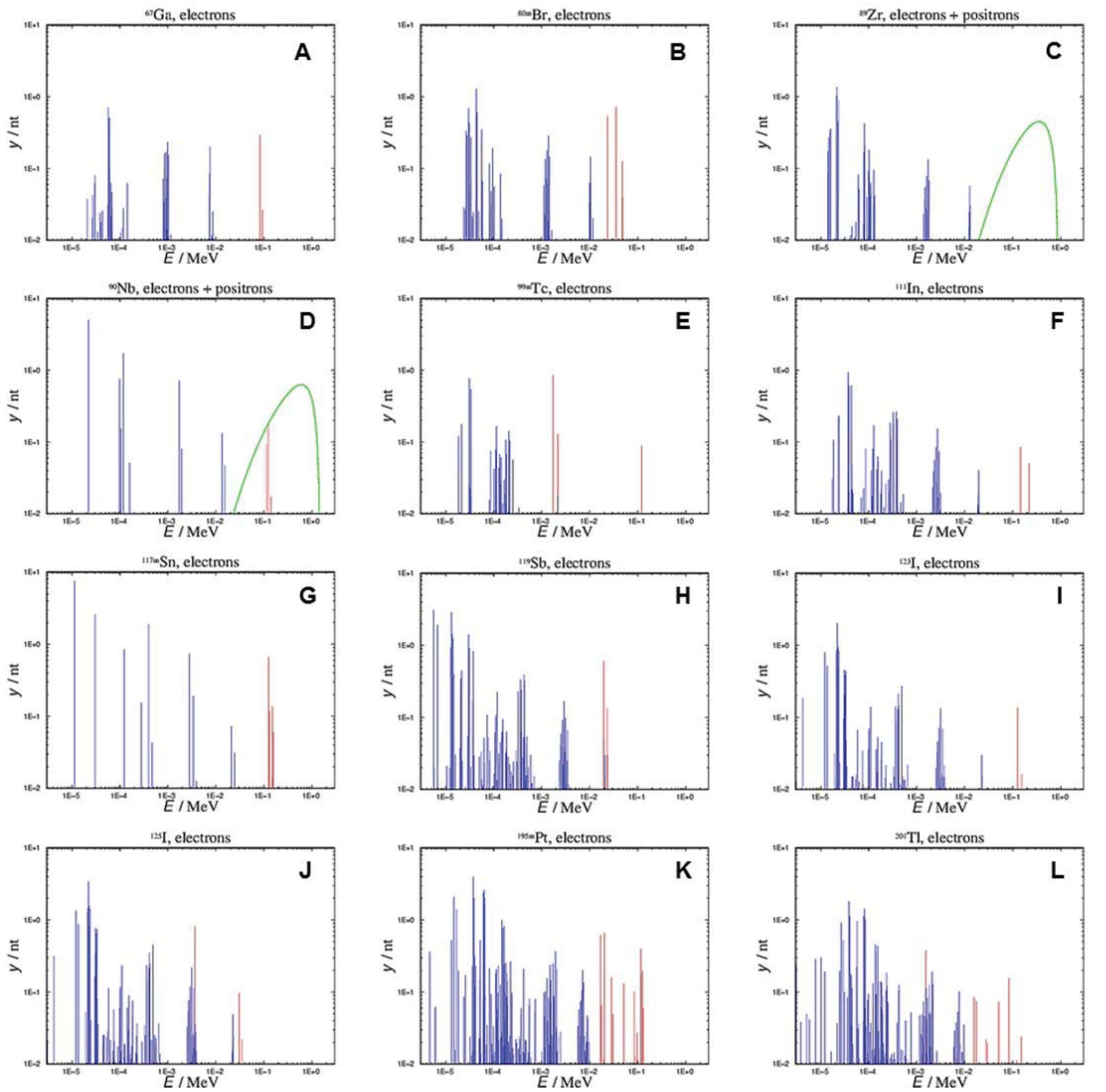
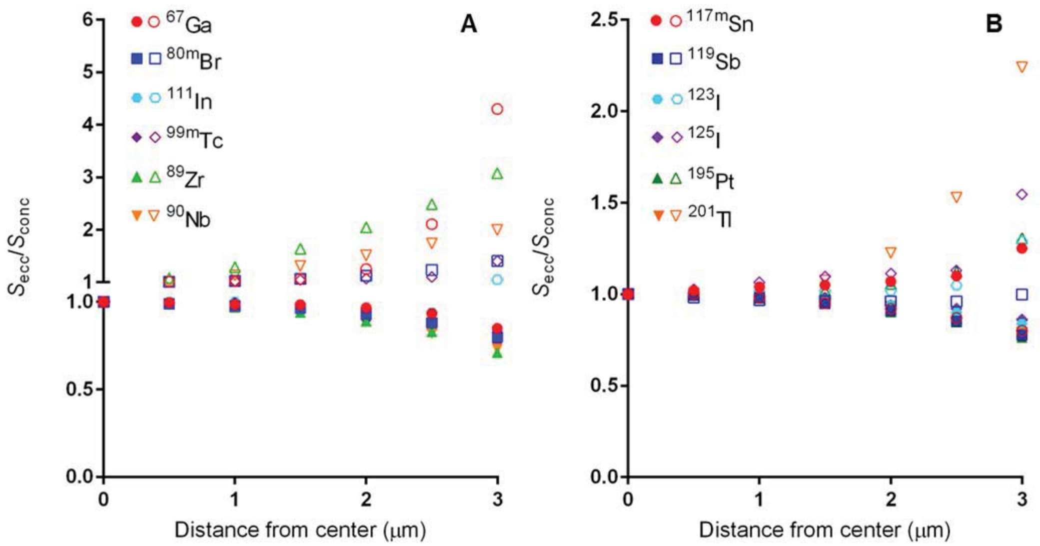
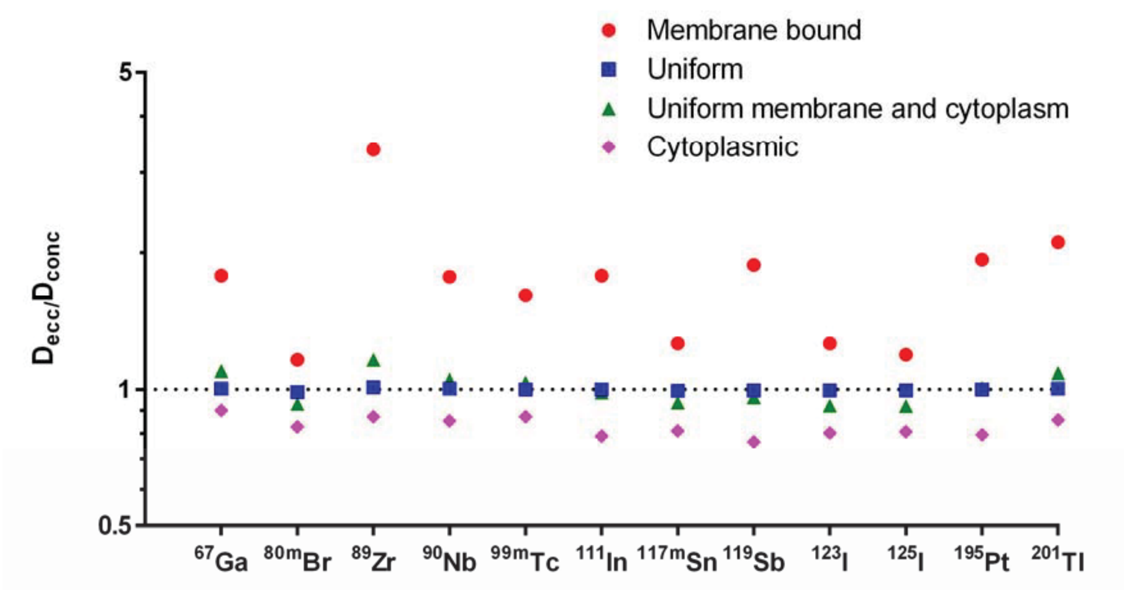


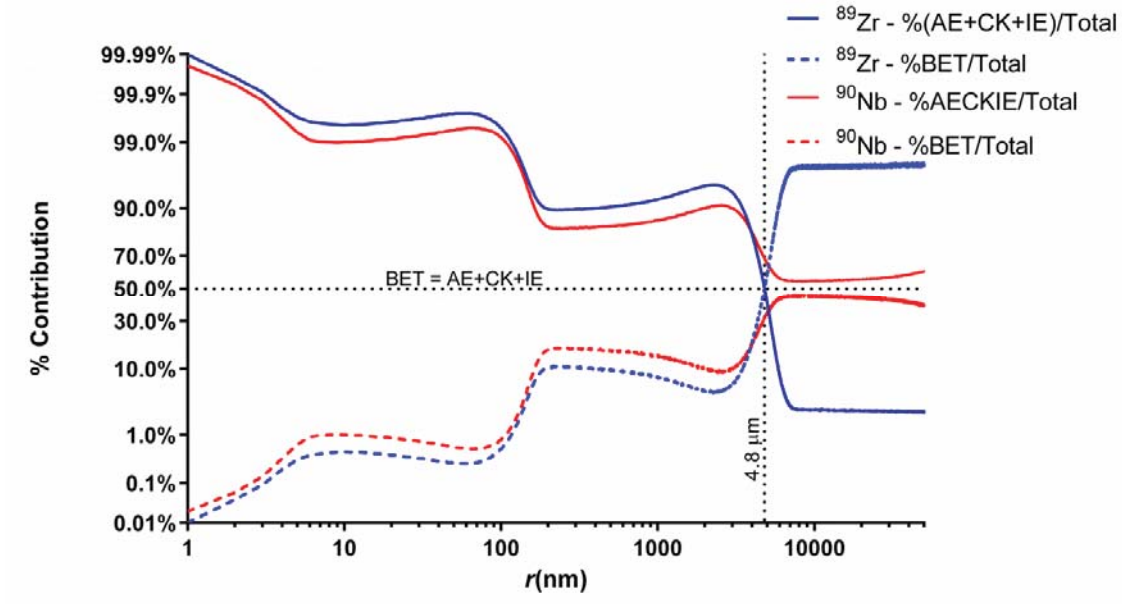
SUPPLEMENTAL FIGURE 1. Electron yield of Auger, Coster-Kronig and internal conversion electrons: (A) ^{67}Ga, (B) ^{80m}Br, (C) ^{89}Zr, (D) ^{90}Nb, (E) ^{99m}Tc, (F) ^{111}In, (G) ^{117m}Sn, (H) ^{119}Sb, (I) ^{123}I, (J) ^{125}I, (K) ^{195m}Pt and (L) ^{201}Tl (*1*). Atomic (i.e. AE and CK), and nuclear (i.e. IE) spectra are shown in blue and red, respectively, while the β-spectra are plotted in green.



SUPPLEMENTAL FIGURE 2. Effect of eccentricity for a cell configuration of R_C = 5 µm and R_N = 2 µm. Solid and open symbols denote *S* ratios for (N←Cy) and (N←CS), respectively.



SUPPLEMENTAL FIGURE 3. Comparison of mean absorbed dose to the nucleus for concentric and eccentric cell/nucleus arrangements. Activity was distributed either 1) exclusively on the membrane, 2) uniformly throughout the cell, 3) uniformly on the cell membrane and cytoplasm or 4) uniformly throughout the cytoplasm.



SUPPLEMENTAL FIGURE 4. Comparison of DPKs for ^{89}Zr (blue) and ^{90}Nb (red), showing the contributions of the Auger, Coster-Kronig, conversion electrons (AE+CK+IE) and the β spectrum (BET) to the total dose. Note for ^{89}Zr: beyond a distance of 4.8 μm the contribution of the β spectrum exceeds that of the AE+CK+IE spectrum.

SUPPLEMENTAL TABLE 1

Summary of Auger electron-emitting radionuclides used as theranostic agents (*14*).

Per decay	$^{67}Ga_{(A)}$	$^{80m}Br^{†}_{(B)}$	$^{89}Zr_{(B)}$	$^{90}Nb_{(B)}$	$^{99m}Tc_{(A)}$	$^{111}In_{(A)}$	$^{117m}Sn_{(A)}$	$^{119}Sb_{(A)}$	$^{123}I^{*}_{(A)}$	$^{125}I_{(A)}$	$^{195m}Pt_{(A)}$	$^{201}Tl_{(A)}$
Half-life (days); Decay mode	3.26; EC[g]	0.18; IT[h]	3.27, EC β^+	0.61; EC β^+	0.25; IT β^-	2.80; EC	13.8; IT	1.59; EC	0.55 ; EC	59.40; EC	4.02; IT	3.04; EC
Yield of AE[a] & CK[b] e^-	4.96	9.60	9.45	8.77	4.41	7.43	14.20	23.68	13.71	23.01	36.55	20.91
Yield of IE[c] e^-	0.34	1.61	8.54E-3	0.34	1.10	0.16	1.15	0.84	0.16	0.95	2.78	0.91
Yield of x-rays	6.87	12.00	10.72	10.10	5.58	9.50	16.1	26.37	15.84	26.53	41.10	24.25
Yield of γ rays	0.87	0.39	1.00	2.80	0.89	1.85	0.89	0.16	0.86	0.07	0.17	0.13
Yield of β^+ or β^-	-	-	0.23	0.54	3.70E-05	-	-	-	-	-	-	-
Yield of AP[d]	-	-	0.45	1.07	-	-	-	-	-	-	-	-
Number of AE and CK e^-	9	9	11	11	22	14	13	13	13	13	14	15
Number of IE e^-	60	12	30	327	32	12	17	5	246	6	51	42
Number of x-rays	25	32	40	40	80	42	49	49	49	49	62	62
Number of γ- rays	10	2	5	55	6	2	3	1	45	1	9	9
Number of β^+ or β^-	-	-	1	5	3	-	-	-	-	-	-	-
Number of AP	-	-	1	1	-	-	-	-	-	-	-	-
Total γ- & x-ray energy (keV/nt)	160.0	24.2	925.7	3.66E03	127.0	386	158	23.4	173	42.8	77.1	93.6
Total β^+ or β^- energy (keV/nt)	-	-	89.9	356	4.20E-03	-	-	-	-	-	-	-
Total IE e^- energy (keV/nt)	29.7	53.9	7.63	43.2	15.2	27.9	155	17.0	21.0	7.28	161	29.9
Total AE & CK energy (keV/nt)	6.64	7.87	4.37	4.42	0.94	6.88	6.28	8.86	7.23	11.9	23.10	15.00
Total energy released (keV/nt)	196	85.9	1.26E03	4.62E03	143	441	320	49.3	201	62.1	262	139
(p/e)[e] ratio	4.50	0.39	11.36	9.10	7.90	11.10	0.98	0.91	6.10	2.20	0.42	2.00
SpA[f] (Bq/kg)	2.18E19	3.24E20	1.65E19	8.74E19	1.93E20	1.54E19	2.98E18	2.53E19	7.05E19	6.46E17	6.13E18	7.88E18

Yield is the number of radiative species released per decay (/nt). A: SPECT; B: PET. †^{80m}Br – decays to ^{80}Br (yield 1); *^{123}I decays to ^{123}Te and ^{123m}Te, with half-lives too long to play role in molecularly targeted radiotherapy. [a]Auger electron; [b]Coster-Kronig electron; [c]Internal conversion electron; [d]Annihilation photon; [e]Ratio of penetrating to nonpenetrating ionizing radiation, [f]Specific activity, [g]Electron capture, [h]Isomeric Transition.

SUPPLEMENTAL TABLES 2-13

Cellular *S*-values (Gy/Bqs) for ^{67}Ga, ^{80m}Br, ^{89}Zr, ^{90}Nb, ^{99m}Tc, ^{111}In, ^{117m}Sn, ^{119}Sb, ^{123}I, ^{125}I, ^{195m}Pt, and ^{201}Tl: Comparison with MIRD *S*-values, effect of eccentricity and contribution of the AE+CK to the total *S*-value.

SUPPLEMENTAL TABLE 2 ^{67}Ga

R_C	R_N	PENELOPE			$S_{PENELOPE}/S_{MIRD}$			S_{ecc}/S_{conc}		S(AE+CK)/S(Tot)		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	1.53E-01	4.45E-03	2.37E-04	1.21	0.85	0.93	0.78	9.99	0.97	0.91	0.02
3	2	2.57E-02	3.21E-03	7.16E-04	1.12	0.89	0.52	0.80	2.24	0.91	0.89	0.65
4	2	2.57E-02	1.25E-03	1.34E-04	1.12	0.83	1.00	0.83	4.67	0.96	0.80	0.01
4	3	8.45E-03	1.19E-03	3.07E-04	1.09	0.88	0.57	0.83	2.00	0.94	0.83	0.53
5	2	2.57E-02	6.64E-04	8.33E-05	1.12	0.86	1.05	0.83	4.52	0.96	0.73	0.00
5	3	8.45E-03	5.33E-04	8.89E-05	1.09	0.84	1.03	0.86	3.30	0.94	0.73	0.00
5	4	3.78E-03	5.77E-04	1.71E-04	1.07	0.88	0.62	0.84	1.88	0.93	0.79	0.43
6	3	8.45E-03	3.13E-04	6.01E-05	1.09	0.86	1.06	0.86	2.96	0.94	0.65	0.00
6	4	3.78E-03	2.85E-04	6.39E-05	1.07	0.85	1.05	0.88	2.54	0.93	0.67	0.00
6	5	2.02E-03	3.28E-04	1.09E-04	1.06	0.88	0.66	0.86	1.77	0.91	0.75	0.37
7	3	8.45E-03	2.08E-04	4.41E-05	1.09	0.88	1.07	0.86	2.63	0.94	0.58	0.00
7	4	3.78E-03	1.80E-04	4.55E-05	1.07	0.88	1.07	0.88	2.25	0.93	0.58	0.00
7	5	2.02E-03	1.77E-04	4.84E-05	1.06	0.88	1.09	0.88	2.10	0.91	0.60	0.00
7	6	1.21E-03	2.10E-04	7.63E-05	1.06	0.90	0.70	0.87	1.64	0.90	0.70	0.31
8	4	3.78E-03	1.48E-04	3.45E-05	1.07	0.90	1.08	0.75	2.12	0.93	0.43	0.00
8	5	2.02E-03	1.34E-04	3.60E-05	1.06	0.90	1.08	0.77	1.91	0.91	0.44	0.00
8	6	1.21E-03	1.26E-04	3.82E-05	1.06	0.88	1.08	0.84	1.86	0.90	0.52	0.00
8	7	7.83E-04	1.43E-04	5.65E-05	1.05	0.90	0.73	0.88	1.56	0.88	0.66	0.27
9	5	2.02E-03	8.63E-05	2.81E-05	1.06	0.92	1.09	0.87	1.88	0.91	0.44	0.00
9	6	1.21E-03	8.11E-05	2.93E-05	1.06	0.91	1.10	0.91	1.75	0.90	0.47	0.00
9	7	7.83E-04	8.40E-05	3.09E-05	1.05	0.90	1.09	0.90	1.73	0.88	0.51	0.00
9	8	5.38E-04	1.03E-04	4.37E-05	1.05	0.91	0.76	0.88	1.52	0.87	0.62	0.24
10	5	2.02E-03	6.76E-05	2.27E-05	1.06	0.94	1.10	0.87	1.78	0.91	0.39	0.00
10	6	1.21E-03	6.23E-05	2.35E-05	1.06	0.93	1.11	0.89	1.64	0.90	0.40	0.00
10	7	7.83E-04	6.04E-05	2.44E-05	1.05	0.93	1.11	0.90	2.51	0.88	0.42	0.00
10	8	5.38E-04	6.30E-05	2.56E-05	1.05	0.92	1.10	0.90	2.81	0.87	0.47	0.00
10	9	3.87E-04	7.67E-05	3.50E-05	1.05	0.92	0.79	0.89	0.16	0.86	0.60	0.22
11	5	2.02E-03	5.42E-05	1.88E-05	1.06	-	-	0.87	2.83	0.91	0.36	0.00
11	6	1.21E-03	5.05E-05	1.94E-05	1.06	-	-	0.87	2.48	0.90	0.34	0.00
11	7	7.83E-04	4.80E-05	1.99E-05	1.05	-	-	0.88	2.30	0.88	0.35	0.00
11	8	5.38E-04	4.70E-05	2.06E-05	1.05	-	-	0.90	2.26	0.00	0.38	0.00
11	9	3.87E-04	4.89E-05	2.17E-05	1.05	-	-	0.92	1.51	0.86	0.44	0.00
11	10	2.87E-04	6.00E-05	2.86E-05	-	-	-	0.89	1.41	0.84	0.56	0.19
12	6	1.21E-03	4.18E-05	1.63E-05	1.06	-	-	0.86	1.58	0.90	0.30	0.00
12	7	7.83E-04	3.91E-05	1.66E-05	1.05	-	-	0.89	1.49	0.88	0.31	0.00
12	8	5.38E-04	3.71E-05	1.71E-05	1.05	-	-	0.91	1.43	0.87	0.32	0.00
12	9	3.87E-04	3.70E-05	1.78E-05	1.05	-	-	0.91	1.41	0.86	0.35	0.00
12	10	2.88E-04	3.87E-05	1.86E-05	-	-	-	0.92	1.44	0.84	0.41	0.00
12	11	2.21E-04	4.79E-05	2.40E-05	-	-	-	0.90	1.37	0.83	0.53	0.18

SUPPLEMENTAL TABLE 3 ^{80m}Br

R_C	R_N	PENELOPE			$S_{PENELOPE}/S_{MIRD}$			S_{ecc}/S_{conc}		S(AE+CK)/S(Tot)		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	1.87E-01	1.11E-02	3.60E-03	1.05	1.09	0.80	0.72	1.62	0.78	0.51	0.22
3	2	3.63E-02	8.05E-03	4.74E-03	1.09	1.09	1.04	0.86	1.11	0.66	0.47	0.37
4	2	3.63E-02	4.68E-03	2.04E-03	1.09	1.05	1.04	0.82	1.38	0.69	0.37	0.09
4	3	1.39E-02	3.98E-03	2.60E-03	1.08	1.13	1.12	0.89	1.08	0.62	0.35	0.25
5	2	3.63E-02	3.11E-03	1.34E-03	1.09	1.10	1.41	0.80	1.38	0.69	0.27	0.00
5	3	1.39E-02	2.67E-03	1.42E-03	1.08	1.14	1.21	0.86	1.22	0.62	0.26	0.05
5	4	7.13E-03	2.39E-03	1.71E-03	1.10	1.18	1.19	0.92	1.05	0.54	0.28	0.18
6	3	1.39E-02	1.93E-03	1.01E-03	1.08	1.18	1.47	0.84	1.23	0.62	0.19	0.00
6	4	7.13E-03	1.73E-03	1.05E-03	1.10	1.20	1.30	0.88	1.16	0.54	0.20	0.03
6	5	4.30E-03	1.61E-03	1.21E-03	1.12	1.22	1.23	0.92	1.05	0.48	0.22	0.14
7	3	1.39E-02	1.51E-03	7.73E-04	1.08	1.25	1.51	0.81	1.20	0.62	0.15	0.00
7	4	7.13E-03	1.36E-03	7.73E-04	1.10	1.26	1.44	0.85	1.16	0.54	0.14	0.00
7	5	4.30E-03	1.24E-03	7.94E-04	1.12	1.24	1.28	0.89	1.12	0.48	0.15	0.02
7	6	2.86E-03	1.16E-03	8.94E-04	1.14	1.21	1.21	0.93	1.05	0.43	0.19	0.11
8	4	7.13E-03	1.09E-03	5.92E-04	1.10	1.28	1.36	0.82	1.15	0.54	0.11	0.00
8	5	4.30E-03	9.89E-04	5.94E-04	1.12	1.25	1.32	0.87	1.12	0.48	0.11	0.00
8	6	2.86E-03	9.11E-04	6.11E-04	1.14	1.21	1.24	0.90	1.10	0.43	0.13	0.02
8	7	2.03E-03	8.59E-04	6.83E-04	1.15	1.20	1.21	0.94	1.04	0.39	0.16	0.10
9	5	4.30E-03	8.20E-04	4.58E-04	1.12	1.26	1.27	0.84	1.11	0.48	0.09	0.00
9	6	2.86E-03	7.46E-04	4.66E-04	1.14	1.23	1.29	0.88	1.09	0.43	0.09	0.00
9	7	2.03E-03	6.98E-04	4.83E-04	1.15	1.22	1.24	0.91	1.07	0.39	0.11	0.02
9	8	1.51E-03	6.60E-04	5.37E-04	1.16	1.21	1.22	0.94	1.03	0.36	0.15	0.08
10	5	4.30E-03	6.88E-04	3.56E-04	1.12	1.25	1.21	0.81	1.16	0.48	0.07	0.00
10	6	2.86E-03	6.35E-04	3.66E-04	1.14	1.25	1.27	0.85	1.11	0.43	0.07	0.00
10	7	2.03E-03	5.81E-04	3.75E-04	1.15	1.23	1.29	0.88	1.09	0.39	0.08	0.00
10	8	1.51E-03	5.45E-04	3.90E-04	1.16	1.22	1.26	0.92	1.07	0.36	0.10	0.01
10	9	1.16E-03	5.25E-04	4.32E-04	1.16	1.22	1.23	0.95	1.03	0.33	0.13	0.08
11	5	4.30E-03	5.94E-04	2.79E-04	1.12	-	-	0.78	1.22	0.48	0.06	0.00
11	6	2.86E-03	5.42E-04	2.89E-04	1.14	-	-	0.82	1.14	0.43	0.06	0.00
11	7	2.03E-03	4.99E-04	2.98E-04	1.15	-	-	0.86	1.10	0.39	0.06	0.00
11	8	1.51E-03	4.67E-04	3.08E-04	1.16	-	-	0.89	1.08	0.36	0.07	0.00
11	9	1.16E-03	4.40E-04	3.20E-04	1.16	-	-	0.92	1.07	0.33	0.09	0.01
11	10	9.19E-04	4.24E-04	3.53E-04	-	-	-	0.95	1.03	0.30	0.12	0.07
12	6	2.86E-03	4.63E-04	2.30E-04	1.14	-	-	0.80	1.19	0.49	0.05	0.00
12	7	2.03E-03	4.34E-04	2.39E-04	1.15	-	-	0.83	1.13	0.44	0.05	0.00
12	8	1.51E-03	4.01E-04	2.47E-04	1.16	-	-	0.87	1.09	0.36	0.05	0.00
12	9	1.16E-03	3.75E-04	2.55E-04	1.16	-	-	0.90	1.07	0.33	0.06	0.00
12	10	9.19E-04	3.57E-04	2.65E-04	-	-	-	0.93	1.06	0.30	0.08	0.01
12	11	7.42E-04	3.47E-04	2.91E-04	-	-	-	0.95	1.02	0.29	0.11	0.06

SUPPLEMENTAL TABLE 4 ^{89}Zr

R_C	R_N	PENELOPE			S_{ecc}/S_{conc}*		S(AE+CK)/S(Tot)			S(BET)/S(Tot)		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	7.85E-02	2.67E-03	1.13E-03	0.68	1.13	0.98	0.92	0.90	0.02	0.06	0.06
3	2	1.27E-02	1.86E-03	1.16E-03	0.86	1.05	0.96	0.92	0.90	0.03	0.06	0.07
4	2	1.27E-02	1.08E-03	3.83E-04	0.75	1.44	0.96	0.90	0.83	0.03	0.07	0.11
4	3	4.48E-03	8.02E-04	4.96E-04	0.87	1.08	0.95	0.90	0.86	0.03	0.08	0.09
5	2	1.27E-02	6.22E-04	9.30E-05	0.70	3.86	0.96	0.89	0.61	0.03	0.09	0.29
5	3	4.48E-03	4.88E-04	1.68E-04	0.75	1.49	0.95	0.87	0.76	0.03	0.09	0.17
5	4	2.09E-03	4.04E-04	2.53E-04	0.88	1.07	0.94	0.87	0.83	0.04	0.10	0.12
6	3	4.48E-03	2.97E-04	4.63E-05	0.77	4.55	0.95	0.84	0.49	0.03	0.12	0.41
6	4	2.09E-03	2.53E-04	9.04E-05	0.79	1.58	0.94	0.85	0.70	0.04	0.12	0.22
6	5	1.14E-03	2.31E-04	1.47E-04	0.88	1.11	0.93	0.84	0.80	0.05	0.12	0.15
7	3	4.48E-03	1.89E-04	1.76E-05	0.77	21.64	0.95	0.81	0.13	0.03	0.15	0.79
7	4	2.09E-03	1.63E-04	2.83E-05	0.76	4.61	0.94	0.80	0.39	0.04	0.15	0.51
7	5	1.14E-03	1.50E-04	5.53E-05	0.79	1.62	0.93	0.81	0.64	0.05	0.15	0.28
7	6	6.91E-04	1.46E-04	9.36E-05	0.88	1.08	0.92	0.81	0.76	0.06	0.14	0.18
8	4	2.09E-03	1.08E-04	1.29E-05	0.81	21.44	0.94	0.76	0.09	0.04	0.18	0.85
8	5	1.14E-03	9.90E-05	1.93E-05	0.79	4.60	0.93	0.76	0.32	0.05	0.18	0.58
8	6	6.91E-04	9.67E-05	3.69E-05	0.82	1.62	0.92	0.78	0.59	0.06	0.17	0.32
8	7	4.50E-04	9.79E-05	6.36E-05	0.89	1.09	0.91	0.79	0.73	0.06	0.16	0.20
9	5	1.14E-03	6.90E-05	1.00E-05	0.79	22.43	0.93	0.71	0.07	0.05	0.22	0.88
9	6	6.91E-04	6.49E-05	1.42E-05	0.81	4.93	0.92	0.73	0.27	0.06	0.21	0.64
9	7	4.50E-04	6.64E-05	2.62E-05	0.82	1.70	0.91	0.75	0.54	0.06	0.19	0.37
9	8	3.10E-04	6.91E-05	4.55E-05	0.88	1.11	0.90	0.77	0.70	0.07	0.18	0.23
10	5	1.14E-03	4.99E-05	7.37E-06	0.85	62.92	0.93	0.67	0.01	0.05	0.26	0.96
10	6	6.91E-04	4.66E-05	8.08E-06	0.81	19.73	0.92	0.67	0.05	0.06	0.26	0.90
10	7	4.50E-04	4.58E-05	1.10E-05	0.82	4.66	0.91	0.69	0.23	0.06	0.24	0.68
10	8	3.10E-04	4.75E-05	1.95E-05	0.84	1.63	0.90	0.72	0.50	0.07	0.22	0.40
10	9	2.23E-04	5.09E-05	3.39E-05	0.89	1.09	0.89	0.74	0.68	0.08	0.19	0.25
11	5	1.14E-03	3.84E-05	6.01E-06	0.87	77.99	0.93	0.62	0.00	0.05	0.29	0.97
11	6	6.91E-04	3.48E-05	6.17E-06	0.80	53.81	0.92	0.62	0.01	0.06	0.30	0.97
11	7	4.50E-04	3.32E-05	6.69E-06	0.84	18.98	0.91	0.64	0.04	0.06	0.29	0.92
11	8	3.10E-04	3.36E-05	8.79E-06	0.83	4.69	0.90	0.66	0.20	0.07	0.27	0.72
11	9	2.23E-04	3.55E-05	1.51E-05	0.82	1.63	0.89	0.69	0.46	0.08	0.24	0.44
11	10	1.66E-04	3.85E-05	2.60E-05	0.90	1.09	0.88	0.73	0.65	0.09	0.21	0.27
12	6	6.91E-04	2.72E-05	5.12E-06	0.87	68.75	0.92	0.58	0.00	0.06	0.33	0.97
12	7	4.50E-04	2.55E-05	5.25E-06	0.85	48.97	0.91	0.58	0.00	0.06	0.33	0.97
12	8	3.10E-04	2.46E-05	5.65E-06	0.84	19.17	0.90	0.60	0.04	0.07	0.32	0.92
12	9	2.23E-04	2.54E-05	7.22E-06	0.83	4.81	0.89	0.63	0.18	0.08	0.30	0.75
12	10	1.66E-04	2.73E-05	1.20E-05	0.84	1.69	0.88	0.67	0.43	0.09	0.26	0.47
12	11	1.27E-04	3.00E-05	2.05E-05	0.90	1.11	0.87	0.70	0.63	0.09	0.23	0.29

*Contribution of AE+CK+IE spectrum only (excluding β spectrum)

SUPPLEMENTAL TABLE 5 ^{90}Nb

R_C	R_N	PENELOPE			S_{ecc}/S_{conc}*		S(AE+CK)/S(Tot)			S(BET)/S(Tot)		
(µm)	(µm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←N)	S(N←N)	S(N←CS)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	8.50E-02	2.91E-03	1.40E-03	0.72	1.01	0.93	0.76	0.77	0.03	0.11	0.10
3	2	1.38E-02	2.12E-03	1.39E-03	0.87	1.02	0.89	0.76	0.75	0.05	0.11	0.11
4	2	1.38E-02	1.30E-03	5.64E-04	0.76	1.20	0.89	0.74	0.67	0.05	0.12	0.15
4	3	4.95E-03	9.82E-04	6.55E-04	0.89	1.04	0.86	0.72	0.69	0.06	0.13	0.14
5	2	1.38E-02	7.93E-04	2.12E-04	0.72	2.05	0.89	0.70	0.44	0.05	0.13	0.25
5	3	4.95E-03	6.37E-04	2.83E-04	0.80	1.29	0.86	0.68	0.57	0.06	0.14	0.20
5	4	2.37E-03	5.31E-04	3.62E-04	0.89	1.06	0.84	0.67	0.63	0.07	0.15	0.17
6	3	4.95E-03	4.20E-04	1.22E-04	0.76	2.11	0.86	0.64	0.32	0.06	0.16	0.31
6	4	2.37E-03	3.60E-04	1.69E-04	0.81	1.30	0.84	0.63	0.48	0.07	0.17	0.24
6	5	1.33E-03	3.23E-04	2.25E-04	0.90	1.05	0.82	0.62	0.57	0.08	0.17	0.19
7	3	4.95E-03	2.86E-04	6.61E-05	0.78	3.07	0.86	0.58	0.09	0.06	0.19	0.41
7	4	2.37E-03	2.49E-04	8.19E-05	0.79	1.94	0.84	0.57	0.24	0.07	0.19	0.34
7	5	1.33E-03	2.29E-04	1.12E-04	0.82	1.26	0.82	0.58	0.41	0.08	0.19	0.27
7	6	8.23E-04	2.11E-04	1.51E-04	0.91	1.03	0.79	0.58	0.52	0.09	0.19	0.21
8	4	2.37E-03	1.79E-04	4.97E-05	0.80	2.57	0.84	0.52	0.06	0.07	0.22	0.42
8	5	1.33E-03	1.64E-04	5.97E-05	0.78	1.79	0.82	0.52	0.19	0.08	0.22	0.37
8	6	8.23E-04	1.53E-04	8.06E-05	0.85	1.24	0.79	0.53	0.36	0.09	0.21	0.29
8	7	5.48E-04	1.48E-04	1.08E-04	0.91	1.04	0.77	0.55	0.48	0.11	0.20	0.23
9	5	1.33E-03	1.20E-04	3.89E-05	0.83	2.21	0.82	0.46	0.05	0.08	0.25	0.43
9	6	8.23E-04	1.14E-04	4.63E-05	0.83	1.67	0.79	0.47	0.15	0.09	0.24	0.38
9	7	5.48E-04	1.10E-04	6.10E-05	0.86	1.22	0.77	0.49	0.32	0.11	0.23	0.31
9	8	3.86E-04	1.08E-04	8.10E-05	0.92	1.04	0.75	0.51	0.45	0.11	0.22	0.25
10	5	1.33E-03	9.50E-05	3.01E-05	0.83	2.23	0.82	0.41	0.01	0.08	0.27	0.45
10	6	8.23E-04	8.84E-05	3.20E-05	0.84	1.96	0.79	0.41	0.04	0.09	0.27	0.43
10	7	5.48E-04	8.51E-05	3.70E-05	0.83	1.56	0.77	0.43	0.13	0.11	0.26	0.39
10	8	3.86E-04	8.31E-05	4.76E-05	0.86	1.19	0.75	0.45	0.28	0.11	0.25	0.32
10	9	2.83E-04	8.33E-05	6.29E-05	0.93	1.03	0.72	0.48	0.41	0.12	0.23	0.26
11	5	1.32E-03	7.64E-05	2.48E-05	0.82	2.11	0.82	0.37	0.00	0.08	0.29	0.45
11	6	8.21E-04	7.04E-05	2.57E-05	0.83	1.93	0.79	0.36	0.01	0.09	0.29	0.45
11	7	5.47E-04	6.68E-05	2.68E-05	0.84	1.77	0.77	0.37	0.03	0.11	0.28	0.44
11	8	3.85E-04	6.49E-05	3.03E-05	0.85	1.50	0.75	0.40	0.11	0.11	0.27	0.40
11	9	2.83E-04	6.46E-05	3.81E-05	0.87	1.20	0.72	0.42	0.26	0.12	0.26	0.34
11	10	2.15E-04	6.53E-05	4.97E-05	0.92	1.04	0.71	0.46	0.39	0.13	0.24	0.28
12	6	8.21E-04	5.83E-05	2.11E-05	0.83	1.92	0.79	0.33	0.00	0.09	0.31	0.45
12	7	5.47E-04	5.45E-05	2.18E-05	0.84	1.79	0.77	0.32	0.00	0.11	0.30	0.45
12	8	3.85E-04	5.23E-05	2.28E-05	0.86	1.67	0.75	0.34	0.02	0.11	0.30	0.44
12	9	2.83E-04	5.14E-05	2.55E-05	0.86	1.47	0.72	0.36	0.10	0.12	0.29	0.41
12	10	2.14E-04	5.16E-05	3.14E-05	0.88	1.20	0.71	0.40	0.23	0.13	0.27	0.35
12	11	1.67E-04	5.29E-05	4.06E-05	0.92	1.06	0.69	0.43	0.36	0.14	0.26	0.29

*Contribution of AE+CK+IE spectrum only (excluding β spectrum)

SUPPLEMENTAL TABLE 6 ^{99m}Tc

R_C	R_N	PENELOPE			$S_{PENELOPE}/S_{MIRD}$			S_{ecc}/S_{conc}		$S(AE+CK)/S(Tot)$		
(μm)	(μm)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)	*S*(N←Cy)	*S*(N←CS)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)
3	1	8.94E-02	4.66E-04	1.71E-04	0.99	0.99	1.42	0.83	1.73	0.26	0.46	0.67
3	2	1.18E-02	3.52E-04	1.70E-04	0.99	1.02	1.32	0.91	1.33	0.27	0.47	0.65
4	2	1.18E-02	1.98E-04	9.02E-05	0.99	1.09	1.15	0.83	1.28	0.27	0.55	0.63
4	3	3.62E-03	1.65E-04	9.21E-05	1.00	1.01	1.13	0.89	1.20	0.28	0.51	0.62
5	2	1.18E-02	1.28E-04	4.57E-05	0.99	1.07	0.87	0.79	1.46	0.27	0.57	0.53
5	3	3.62E-03	1.05E-04	4.97E-05	1.00	1.04	0.98	0.85	1.23	0.28	0.54	0.56
5	4	1.58E-03	9.09E-05	5.42E-05	0.99	0.99	1.04	0.93	1.20	0.29	0.50	0.57
6	3	3.62E-03	7.12E-05	2.65E-05	1.00	0.99	0.81	0.79	1.35	0.28	0.54	0.43
6	4	1.58E-03	6.07E-05	3.06E-05	0.99	0.99	0.93	0.85	1.17	0.29	0.51	0.49
6	5	8.27E-04	5.55E-05	3.48E-05	0.99	0.97	1.01	0.93	1.14	0.29	0.48	0.52
7	3	3.62E-03	5.08E-05	1.47E-05	1.00	0.95	0.73	0.75	1.86	0.28	0.50	0.25
7	4	1.58E-03	4.32E-05	1.73E-05	0.99	0.95	0.81	0.84	1.46	0.29	0.50	0.35
7	5	8.27E-04	3.86E-05	2.07E-05	0.99	0.96	0.92	0.88	1.22	0.29	0.48	0.43
7	6	4.88E-04	3.68E-05	2.41E-05	0.99	0.96	1.00	0.93	1.14	0.29	0.45	0.47
8	4	1.58E-03	3.20E-05	1.05E-05	0.99	0.92	0.78	0.80	1.63	0.29	0.46	0.18
8	5	8.27E-04	2.86E-05	1.25E-05	0.99	0.94	0.84	0.85	1.35	0.29	0.45	0.29
8	6	4.88E-04	2.64E-05	1.49E-05	0.99	0.95	0.92	0.86	1.17	0.29	0.45	0.38
8	7	3.13E-04	2.61E-05	1.75E-05	0.99	0.96	0.99	0.92	1.12	0.29	0.43	0.44
9	5	8.27E-04	2.20E-05	8.08E-06	0.99	0.92	0.82	0.83	1.53	0.29	0.42	0.14
9	6	4.88E-04	2.03E-05	9.47E-06	0.99	0.94	0.85	0.84	1.27	0.29	0.41	0.25
9	7	3.13E-04	1.91E-05	1.13E-05	0.99	0.95	0.92	0.93	1.14	0.29	0.42	0.34
9	8	2.13E-04	1.92E-05	1.33E-05	0.99	0.96	0.99	0.94	1.09	0.29	0.40	0.40
10	5	8.27E-04	1.72E-05	5.85E-06	0.99	0.91	0.90	0.82	1.61	0.29	0.37	0.05
10	6	4.88E-04	1.60E-05	6.47E-06	0.99	0.93	0.85	0.82	1.44	0.29	0.37	0.12
10	7	3.13E-04	1.50E-05	7.46E-06	0.99	0.94	0.87	0.85	1.27	0.29	0.38	0.21
10	8	2.13E-04	1.46E-05	8.84E-06	0.99	0.96	0.93	0.90	1.15	0.29	0.38	0.30
10	9	1.52E-04	1.47E-05	1.05E-05	0.99	0.96	0.99	0.92	1.12	0.29	0.38	0.37
11	5	8.27E-04	1.39E-05	4.64E-06	0.99	-	-	0.79	1.64	0.29	0.34	0.01
11	6	4.88E-04	1.28E-05	4.87E-06	0.99	-	-	0.82	1.51	0.29	0.42	0.04
11	7	3.13E-04	1.21E-05	5.31E-06	0.99	-	-	0.86	1.38	0.29	0.42	0.10
11	8	2.13E-04	1.15E-05	6.07E-06	0.99	-	-	0.88	1.24	0.29	0.44	0.18
11	9	1.52E-04	1.13E-05	7.14E-06	0.99	-	-	0.91	1.13	0.29	0.45	0.28
11	10	1.12E-04	1.16E-05	8.44E-06	-	-	-	0.95	1.11	0.29	0.45	0.35
12	6	4.88E-04	1.06E-05	3.96E-06	0.99	-	-	0.83	1.63	0.29	0.38	0.01
12	7	3.13E-04	9.91E-06	4.13E-06	0.99	-	-	0.85	1.48	0.29	0.38	0.03
12	8	2.13E-04	9.50E-06	4.47E-06	0.99	-	-	0.85	1.36	0.29	0.39	0.08
12	9	1.52E-04	9.16E-06	5.05E-06	0.99	-	-	0.87	1.22	0.29	0.41	0.16
12	10	1.12E-04	9.10E-06	5.89E-06	-	-	-	0.91	1.11	0.29	0.42	0.25
12	11	8.54E-05	9.39E-06	6.94E-06	-	-	-	0.94	1.07	0.29	0.42	0.32

SUPPLEMENTAL TABLE 7 ^{111}In

R_C	R_N	PENELOPE			$S_{PENELOPE}/S_{MIRD}$			S_{ecc}/S_{conc}		S(AE+CK)/S(Tot)		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	1.40E-01	1.50E-03	6.27E-04	1.02	0.99	1.50	0.84	1.62	0.99	0.92	0.86
3	2	1.93E-02	1.14E-03	6.39E-04	1.01	1.02	1.42	0.93	1.30	0.98	0.91	0.89
4	2	1.93E-02	7.26E-04	4.13E-04	1.01	1.21	1.60	0.86	1.19	0.98	0.89	0.90
4	3	6.22E-03	6.28E-04	4.14E-04	1.02	1.25	1.48	0.92	1.17	1.02	0.90	0.89
5	2	1.93E-02	5.31E-04	2.78E-04	1.01	1.34	1.56	0.80	1.11	0.98	0.89	0.91
5	3	6.22E-03	4.43E-04	2.71E-04	1.02	1.30	1.44	0.87	1.10	0.97	0.91	0.91
5	4	2.85E-03	3.89E-04	2.68E-04	1.05	1.20	1.31	0.94	1.11	0.97	0.91	0.90
6	3	6.22E-03	3.33E-04	1.73E-04	1.02	1.31	1.18	0.80	1.13	0.97	0.92	0.91
6	4	2.85E-03	2.81E-04	1.73E-04	1.05	1.21	1.19	0.87	1.12	0.97	0.90	0.90
6	5	1.56E-03	2.46E-04	1.75E-04	1.05	1.12	1.18	0.94	1.12	0.96	0.90	0.89
7	3	6.22E-03	2.58E-04	1.04E-04	1.02	1.26	0.91	0.72	1.23	0.97	0.88	0.90
7	4	2.85E-03	2.21E-04	1.09E-04	1.05	1.21	1.00	0.79	1.15	0.97	0.90	0.89
7	5	1.56E-03	1.85E-04	1.13E-04	1.05	1.12	1.06	0.87	1.12	0.96	0.90	0.88
7	6	9.55E-04	1.66E-04	1.19E-04	1.05	1.08	1.10	0.93	1.12	0.96	0.89	0.87
8	4	2.85E-03	1.66E-04	6.50E-05	1.05	1.11	0.81	0.77	1.30	0.97	0.91	0.86
8	5	1.56E-03	1.44E-04	7.16E-05	1.05	1.09	0.92	0.83	1.16	0.96	0.90	0.86
8	6	9.55E-04	1.25E-04	7.73E-05	1.05	1.06	1.00	0.88	1.12	0.96	0.89	0.87
8	7	6.29E-04	1.15E-04	8.42E-05	1.04	1.04	1.06	0.94	1.10	0.95	0.88	0.86
9	5	1.56E-03	1.12E-04	4.29E-05	1.05	1.03	0.76	0.80	1.40	0.96	0.88	0.82
9	6	9.55E-04	9.85E-05	4.91E-05	1.05	1.03	0.86	0.83	1.20	0.96	0.87	0.83
9	7	6.29E-04	8.84E-05	5.51E-05	1.04	1.03	0.98	0.89	1.12	0.95	0.87	0.84
9	8	4.36E-04	8.27E-05	6.14E-05	1.04	1.02	1.03	0.94	1.09	0.95	0.87	0.84
10	5	1.56E-03	8.64E-05	2.46E-05	1.05	0.96	0.63	0.76	1.79	0.96	0.90	0.75
10	6	9.55E-04	7.74E-05	2.98E-05	1.05	0.98	0.74	0.80	1.40	0.96	0.86	0.79
10	7	6.29E-04	7.02E-05	3.52E-05	1.04	1.00	0.85	0.85	1.21	0.95	0.87	0.81
10	8	4.36E-04	6.52E-05	4.07E-05	1.04	1.02	0.95	0.90	1.13	0.95	0.86	0.82
10	9	3.15E-04	6.12E-05	4.62E-05	1.03	1.00	1.02	0.95	1.09	0.94	0.86	0.83
11	5	1.56E-03	6.87E-05	1.33E-05	1.05	-	-	0.73	1.57	0.96	0.83	0.65
11	6	9.55E-04	6.12E-05	1.75E-05	1.05	-	-	0.78	1.81	0.96	0.86	0.69
11	7	6.29E-04	5.65E-05	2.17E-05	1.04	-	-	0.79	1.41	0.95	0.86	0.75
11	8	4.36E-04	5.21E-05	2.62E-05	1.04	-	-	0.87	1.22	0.95	0.83	0.79
11	9	3.15E-04	4.85E-05	3.09E-05	1.03	-	-	0.90	1.12	0.94	0.85	0.80
11	10	2.36E-04	4.67E-05	3.57E-05	-	-	-	0.96	1.09	0.94	0.85	0.82
12	6	9.55E-04	4.82E-05	9.95E-06	1.05	-	-	0.77	2.51	0.96	0.87	0.58
12	7	6.29E-04	4.55E-05	1.30E-05	1.04	-	-	0.77	1.83	0.95	0.82	0.65
12	8	4.36E-04	4.17E-05	1.64E-05	1.04	-	-	0.82	1.43	0.98	0.83	0.72
12	9	3.15E-04	3.92E-05	2.01E-05	1.03	-	-	0.85	1.22	0.94	0.84	0.76
12	10	2.36E-04	3.75E-05	2.41E-05	-	-	-	0.90	1.11	0.94	0.83	0.79
12	11	1.81E-04	3.75E-05	2.81E-05	-	-	-	0.93	1.08	0.94	0.82	0.80

SUPPLEMENTAL TABLE 8 ^{117m}Sn

R_C	R_N	PENELOPE			$S_{PENELOPE}/S_{MIRD}$			S_{ecc}/S_{conc}		$S(AE+CK)/S(Tot)$		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	1.50E-01	2.24E-03	8.75E-04	1.01	0.90	1.10	0.81	1.64	0.93	0.48	0.37
3	2	2.15E-02	1.71E-03	9.28E-04	0.99	0.92	1.08	0.90	1.29	0.88	0.47	0.36
4	2	2.15E-02	1.03E-03	5.45E-04	0.99	0.99	1.16	0.84	1.25	0.88	0.44	0.41
4	3	7.07E-03	8.87E-04	5.77E-04	1.00	0.99	1.13	0.93	1.16	0.84	0.46	0.40
5	2	2.15E-02	7.26E-04	3.66E-04	0.99	1.05	1.21	0.80	1.25	0.88	0.43	0.44
5	3	7.07E-03	6.21E-04	3.73E-04	1.00	1.07	1.18	0.87	1.16	0.84	0.43	0.43
5	4	3.28E-03	5.53E-04	3.90E-04	1.00	1.04	1.13	0.93	1.10	0.80	0.45	0.41
6	3	7.07E-03	4.70E-04	2.58E-04	1.00	1.10	1.16	0.82	1.14	0.84	0.44	0.44
6	4	3.28E-03	4.12E-04	2.63E-04	1.00	1.08	1.12	0.88	1.10	0.80	0.43	0.42
6	5	1.84E-03	3.71E-04	2.74E-04	1.01	1.03	1.09	0.94	1.08	0.77	0.43	0.40
7	3	7.07E-03	3.68E-04	1.82E-04	1.00	1.10	1.06	0.77	1.13	0.84	0.43	0.42
7	4	3.28E-03	3.21E-04	1.85E-04	1.00	1.08	1.06	0.84	1.10	0.80	0.43	0.41
7	5	1.84E-03	2.87E-04	1.90E-04	1.01	1.05	1.06	0.90	1.06	0.77	0.42	0.39
7	6	1.15E-03	2.63E-04	2.00E-04	1.02	1.01	1.05	0.94	1.05	0.74	0.41	0.38
8	4	3.28E-03	2.61E-04	1.32E-04	1.00	1.07	0.99	0.80	1.15	0.80	0.42	0.37
8	5	1.84E-03	2.31E-04	1.36E-04	1.01	1.05	1.02	0.86	1.09	0.77	0.41	0.37
8	6	1.15E-03	2.07E-04	1.42E-04	1.02	1.02	1.03	0.90	1.07	0.74	0.40	0.36
8	7	7.74E-04	1.92E-04	1.51E-04	1.01	1.00	1.03	0.94	1.05	0.72	0.40	0.35
9	5	1.84E-03	1.91E-04	9.92E-05	1.01	1.04	0.95	0.81	1.17	0.77	0.39	0.32
9	6	1.15E-03	1.71E-04	1.04E-04	1.02	1.02	0.99	0.86	1.09	0.74	0.38	0.33
9	7	7.74E-04	1.56E-04	1.10E-04	1.01	1.01	1.01	0.91	1.06	0.72	0.37	0.34
9	8	5.51E-04	1.47E-04	1.17E-04	1.01	1.00	1.02	0.94	1.04	0.69	0.37	0.33
10	5	1.84E-03	1.58E-04	7.30E-05	1.01	1.02	0.90	0.79	1.26	0.77	0.38	0.27
10	6	1.15E-03	1.43E-04	7.74E-05	1.02	1.01	0.94	0.82	1.17	0.74	0.36	0.29
10	7	7.74E-04	1.31E-04	8.19E-05	1.01	1.01	0.98	0.88	1.11	0.72	0.36	0.30
10	8	5.51E-04	1.21E-04	8.69E-05	1.01	1.00	1.00	0.91	1.07	0.69	0.35	0.31
10	9	4.09E-04	1.15E-04	9.34E-05	1.00	0.99	1.01	0.94	1.05	0.67	0.35	0.31
11	5	1.84E-03	1.31E-04	5.49E-05	1.01	-	-	0.76	1.36	0.77	0.36	0.19
11	6	1.15E-03	1.20E-04	5.84E-05	1.02	-	-	0.81	1.24	0.74	0.35	0.23
11	7	7.74E-04	1.10E-04	6.22E-05	1.01	-	-	0.85	1.15	0.72	0.34	0.25
11	8	5.51E-04	1.03E-04	6.62E-05	1.01	-	-	0.89	1.10	0.69	0.33	0.27
11	9	4.09E-04	9.63E-05	7.05E-05	1.00	-	-	0.92	1.06	0.67	0.33	0.29
11	10	3.14E-04	9.25E-05	7.62E-05	-	-	-	0.95	1.04	0.65	0.33	0.29
12	6	1.15E-03	1.02E-04	4.50E-05	1.02	-	-	0.79	1.31	0.74	0.33	0.16
12	7	7.74E-04	9.44E-05	4.80E-05	1.01	-	-	0.83	1.21	0.72	0.32	0.19
12	8	5.51E-04	8.82E-05	5.13E-05	1.01	-	-	0.85	1.13	0.69	0.31	0.22
12	9	4.09E-04	8.24E-05	5.47E-05	1.01	-	-	0.90	1.08	0.67	0.31	0.25
12	10	3.14E-04	7.84E-05	5.85E-05	-	-	-	0.92	1.05	0.65	0.31	0.26
12	11	2.46E-04	7.62E-05	6.32E-05	-	-	-	0.95	1.04	0.63	0.32	0.28

SUPPLEMENTAL TABLE 9 ^{119}Sb

R_C	R_N	PENELOPE			*S*ecc/*S*conc		*S*(AE+CK)/*S*(Tot)		
(μm)	(μm)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)	*S*(N←Cy)	*S*(N←CS)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)
3	1	2.56E-01	6.55E-03	3.37E-03	0.85	1.30	0.87	0.22	0.10
3	2	3.94E-02	5.26E-03	3.49E-03	0.91	1.15	0.76	0.20	0.10
4	2	3.94E-02	3.62E-03	2.31E-03	0.86	1.08	0.76	0.15	0.11
4	3	1.42E-02	3.11E-03	2.30E-03	0.92	1.07	0.65	0.16	0.11
5	2	3.94E-02	2.73E-03	1.58E-03	0.78	0.96	0.76	0.14	0.11
5	3	1.42E-02	2.33E-03	1.53E-03	0.86	1.01	0.65	0.14	0.11
5	4	7.16E-03	1.97E-03	1.49E-03	0.92	1.03	0.57	0.15	0.11
6	3	1.42E-02	1.80E-03	9.85E-04	0.80	1.02	0.65	0.13	0.12
6	4	7.16E-03	1.51E-03	9.72E-04	0.86	1.02	0.57	0.14	0.12
6	5	4.23E-03	1.27E-03	9.72E-04	0.92	1.04	0.51	0.15	0.12
7	3	1.42E-02	1.38E-03	5.80E-04	0.72	1.18	0.65	0.13	0.14
7	4	7.16E-03	1.18E-03	6.06E-04	0.80	1.09	0.57	0.13	0.13
7	5	4.23E-03	9.83E-04	6.27E-04	0.87	1.06	0.51	0.14	0.13
7	6	2.72E-03	8.45E-04	6.51E-04	0.93	1.05	0.47	0.15	0.12
8	4	7.16E-03	9.04E-04	3.48E-04	0.76	1.23	0.57	0.14	0.15
8	5	4.23E-03	7.70E-04	3.88E-04	0.81	1.10	0.51	0.14	0.14
8	6	2.72E-03	6.64E-04	4.20E-04	0.87	1.05	0.47	0.14	0.13
8	7	1.86E-03	5.85E-04	4.52E-04	0.92	1.04	0.45	0.15	0.13
9	5	4.23E-03	5.98E-04	2.21E-04	0.77	1.34	0.51	0.14	0.16
9	6	2.72E-03	5.24E-04	2.60E-04	0.82	1.14	0.47	0.14	0.14
9	7	1.86E-03	4.62E-04	2.93E-04	0.88	1.06	0.45	0.14	0.14
9	8	1.32E-03	4.19E-04	3.25E-04	0.95	1.04	0.43	0.15	0.13
10	5	4.23E-03	4.64E-04	1.14E-04	0.75	1.90	0.51	0.14	0.18
10	6	2.72E-03	4.11E-04	1.48E-04	0.78	1.36	0.47	0.14	0.16
10	7	1.86E-03	3.67E-04	1.81E-04	0.82	1.14	0.45	0.14	0.15
10	8	1.32E-03	3.33E-04	2.11E-04	0.87	1.05	0.43	0.14	0.14
10	9	9.70E-04	3.08E-04	2.41E-04	0.94	1.03	0.42	0.15	0.13
11	5	4.23E-03	3.59E-04	5.23E-05	0.73	3.13	0.51	0.14	0.22
11	6	2.72E-03	3.19E-04	7.60E-05	0.77	1.97	0.47	0.15	0.18
11	7	1.86E-03	2.91E-04	1.03E-04	0.78	1.39	0.45	0.14	0.16
11	8	1.32E-03	2.67E-04	1.31E-04	0.84	1.15	0.43	0.14	0.15
11	9	9.70E-04	2.46E-04	1.57E-04	0.88	1.06	0.42	0.14	0.14
11	10	7.33E-04	2.34E-04	1.83E-04	0.93	1.02	0.41	0.15	0.13
12	6	2.72E-03	2.50E-04	3.50E-05	0.76	3.28	0.47	0.15	0.22
12	7	1.86E-03	2.29E-04	5.32E-05	0.77	2.01	0.45	0.15	0.19
12	8	1.32E-03	2.12E-04	7.51E-05	0.79	1.43	0.43	0.14	0.16
12	9	9.70E-04	1.99E-04	9.76E-05	0.83	1.18	0.42	0.14	0.15
12	10	7.33E-04	1.88E-04	1.20E-04	0.87	1.08	0.41	0.15	0.14
12	11	5.67E-04	1.81E-04	1.42E-04	0.94	1.05	0.40	0.15	0.13

SUPPLEMENTAL TABLE 10 ^{123}I

R_C	R_N	PENELOPE			$S_{PENELOPE}/S_{MIRD}$			S_{ecc}/S_{conc}		S(AE+CK)/S(Tot)		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	1.55E-01	1.37E-03	3.85E-04	1.01	0.81	1.24	0.87	2.55	0.99	0.86	0.81
3	2	2.12E-02	1.01E-03	4.10E-04	0.99	0.83	1.22	0.91	1.70	0.98	0.88	0.81
4	2	2.12E-02	5.57E-04	2.56E-04	0.99	0.97	1.37	0.85	1.44	0.98	0.82	0.87
4	3	6.67E-03	5.06E-04	2.68E-04	0.99	0.97	1.33	0.91	1.38	0.97	0.85	0.84
5	2	2.12E-02	3.88E-04	1.87E-04	0.99	1.10	1.52	0.83	1.40	0.98	0.86	0.91
5	3	6.67E-03	3.27E-04	1.88E-04	0.99	1.11	1.47	0.88	1.22	0.97	0.83	0.87
5	4	2.97E-03	3.05E-04	1.91E-04	1.00	1.05	1.37	0.95	1.23	0.96	0.85	0.85
6	3	6.67E-03	2.54E-04	1.40E-04	0.99	1.21	1.52	0.84	1.08	0.97	0.83	0.90
6	4	2.97E-03	2.16E-04	1.38E-04	1.00	1.17	1.43	0.90	1.09	0.96	0.87	0.87
6	5	1.61E-03	2.05E-04	1.38E-04	1.01	1.09	1.32	0.93	1.13	0.96	0.86	0.86
7	3	6.67E-03	1.98E-04	1.04E-04	0.99	1.28	1.45	0.76	1.07	0.97	0.83	0.91
7	4	2.97E-03	1.74E-04	1.02E-04	1.00	1.25	1.36	0.82	1.06	0.96	0.84	0.87
7	5	1.61E-03	1.53E-04	9.96E-05	1.01	1.17	1.27	0.93	1.10	0.96	0.83	0.87
7	6	9.77E-04	1.42E-04	1.01E-04	1.02	1.06	1.22	0.94	1.14	0.95	0.86	0.85
8	4	2.97E-03	1.43E-04	7.35E-05	1.00	1.28	1.18	0.80	1.10	0.96	0.85	0.88
8	5	1.61E-03	1.27E-04	7.31E-05	1.01	1.22	1.18	0.81	1.08	0.96	0.83	0.87
8	6	9.77E-04	1.11E-04	7.31E-05	1.02	1.13	1.17	0.88	1.10	0.95	0.82	0.85
8	7	6.42E-04	1.03E-04	7.45E-05	1.02	1.04	1.15	0.96	1.11	0.95	0.85	0.83
9	5	1.61E-03	1.03E-04	5.25E-05	1.01	1.19	1.06	0.79	1.06	0.96	0.83	0.85
9	6	9.77E-04	8.91E-05	5.36E-05	1.02	1.12	1.09	0.86	1.04	0.95	0.85	0.83
9	7	6.42E-04	8.18E-05	5.45E-05	1.02	1.09	1.10	0.89	1.03	0.95	0.82	0.82
9	8	4.46E-04	7.79E-05	5.61E-05	1.02	1.04	1.10	0.93	1.06	0.94	0.82	0.82
10	5	1.61E-03	8.52E-05	3.61E-05	1.01	1.16	0.90	0.78	1.18	0.96	0.84	0.83
10	6	9.77E-04	7.41E-05	3.83E-05	1.02	1.10	0.98	0.82	1.12	0.95	0.82	0.82
10	7	6.42E-04	6.78E-05	3.99E-05	1.02	1.10	1.03	0.85	1.07	0.95	0.80	0.81
10	8	4.46E-04	5.95E-05	4.14E-05	1.02	1.05	1.06	0.94	1.07	0.94	0.83	0.80
10	9	3.23E-04	5.88E-05	4.31E-05	1.02	1.01	1.07	0.95	1.09	0.94	0.81	0.80
11	5	1.61E-03	7.02E-05	2.44E-05	1.01	-	-	0.74	1.34	0.96	0.79	0.78
11	6	9.77E-04	6.29E-05	2.69E-05	1.02	-	-	0.78	1.21	0.95	0.81	0.78
11	7	6.42E-04	5.47E-05	2.86E-05	1.02	-	-	0.84	1.13	0.95	0.84	0.78
11	8	4.46E-04	5.04E-05	3.05E-05	1.02	-	-	0.88	1.08	0.94	0.79	0.78
11	9	3.23E-04	4.73E-05	3.21E-05	1.02	-	-	0.91	1.07	0.94	0.80	0.79
11	10	2.42E-04	4.52E-05	3.38E-05	-	-	-	0.97	1.09	0.93	0.79	0.79
12	6	9.77E-04	5.23E-05	1.81E-05	1.02	-	-	0.77	1.48	0.95	0.82	0.73
12	7	6.42E-04	4.72E-05	2.01E-05	1.02	-	-	0.78	1.31	0.95	0.79	0.75
12	8	4.46E-04	4.17E-05	2.21E-05	1.02	-	-	0.85	1.17	0.94	0.82	0.75
12	9	3.23E-04	3.94E-05	2.38E-05	1.02	-	-	0.85	1.11	0.94	0.78	0.76
12	10	2.42E-04	3.66E-05	2.53E-05	-	-	-	0.90	1.10	0.93	0.78	0.77
12	11	1.87E-04	3.57E-05	2.70E-05	-	-	-	0.97	1.11	0.93	0.79	0.78

SUPPLEMENTAL TABLE 11 ^{125}I

R_C	R_N	PENELOPE			$S_{PENELOPE}$ / S_{MIRD}			S_{ecc}/S_{conc}		S(AE+CK)/S(Tot)		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	3.55E-01	3.18E-03	7.29E-04	1.04	0.81	1.29	0.88	2.79	0.72	0.63	0.70
3	2	4.88E-02	2.33E-03	7.76E-04	1.01	0.83	1.28	0.91	1.82	0.71	0.63	0.68
4	2	4.88E-02	1.20E-03	4.93E-04	1.01	0.96	1.45	0.88	1.65	0.71	0.65	0.71
4	3	1.53E-02	1.09E-03	5.15E-04	1.01	0.95	1.40	0.94	1.45	0.71	0.65	0.70
5	2	4.88E-02	7.83E-04	3.60E-04	1.01	1.07	1.60	0.88	1.37	0.71	0.67	0.73
5	3	1.53E-02	6.81E-04	3.63E-04	1.01	1.11	1.55	0.91	1.22	0.71	0.67	0.71
5	4	6.78E-03	6.48E-04	3.74E-04	1.02	1.05	1.48	0.93	1.25	0.71	0.66	0.70
6	3	1.53E-02	5.06E-04	2.75E-04	1.01	1.23	1.63	0.86	1.20	0.71	0.67	0.70
6	4	6.78E-03	4.49E-04	2.73E-04	1.02	1.21	1.54	0.89	1.18	0.71	0.67	0.70
6	5	3.64E-03	4.34E-04	2.76E-04	1.03	1.11	1.45	0.97	1.21	0.71	0.66	0.68
7	3	1.53E-02	3.94E-04	2.10E-04	1.01	1.29	1.59	0.83	1.19	0.71	0.69	0.68
7	4	6.78E-03	3.53E-04	2.06E-04	1.02	1.29	1.49	0.86	1.15	0.71	0.68	0.68
7	5	3.64E-03	3.22E-04	2.05E-04	1.03	1.25	1.43	0.89	1.13	0.71	0.66	0.67
7	6	2.21E-03	3.06E-04	2.07E-04	1.04	1.12	1.37	0.95	1.16	0.70	0.65	0.66
8	4	6.78E-03	2.89E-04	1.56E-04	1.02	1.33	1.37	0.82	1.17	0.71	0.66	0.64
8	5	3.64E-03	2.60E-04	1.55E-04	1.03	1.29	1.36	0.84	1.12	0.71	0.65	0.64
8	6	2.21E-03	2.35E-04	1.55E-04	1.04	1.22	1.35	0.93	1.12	0.70	0.64	0.63
8	7	1.45E-03	2.26E-04	1.58E-04	1.05	1.13	1.33	0.95	1.14	0.70	0.63	0.63
9	5	3.64E-03	2.13E-04	1.17E-04	1.03	1.29	1.28	0.83	1.09	0.71	0.65	0.59
9	6	2.21E-03	1.91E-04	1.18E-04	1.04	1.24	1.29	0.85	1.07	0.70	0.63	0.60
9	7	1.45E-03	1.76E-04	1.19E-04	1.05	1.21	1.30	0.91	1.08	0.70	0.62	0.60
9	8	1.01E-03	1.69E-04	1.22E-04	1.05	1.11	1.28	0.95	1.10	0.70	0.61	0.61
10	5	3.64E-03	1.79E-04	8.75E-05	1.03	1.28	1.17	0.79	1.11	0.71	0.62	0.53
10	6	2.21E-03	1.62E-04	8.90E-05	1.04	1.25	1.21	0.84	1.08	0.70	0.62	0.55
10	7	1.45E-03	1.46E-04	9.06E-05	1.05	1.22	1.23	0.88	1.07	0.70	0.61	0.57
10	8	1.01E-03	1.34E-04	9.23E-05	1.05	1.17	1.24	0.91	1.07	0.70	0.60	0.58
10	9	7.31E-04	1.31E-04	9.51E-05	1.05	1.11	1.23	0.95	1.09	0.69	0.59	0.59
11	5	3.64E-03	1.51E-04	6.41E-05	1.03	-	-	0.76	1.16	0.71	0.61	0.46
11	6	2.21E-03	1.36E-04	6.63E-05	1.04	-	-	0.79	1.11	0.70	0.60	0.49
11	7	1.45E-03	1.24E-04	6.82E-05	1.05	-	-	0.84	1.09	0.70	0.59	0.52
11	8	1.01E-03	1.13E-04	7.03E-05	1.05	-	-	0.88	1.08	0.70	0.59	0.54
11	9	7.31E-04	1.05E-04	7.24E-05	1.05	-	-	0.91	1.06	0.69	0.58	0.56
11	10	5.47E-04	1.02E-04	7.52E-05	-	-	-	0.95	1.09	0.69	0.59	0.57
12	6	2.21E-03	1.15E-04	4.84E-05	1.04	-	-	0.76	1.21	0.70	0.58	0.42
12	7	1.45E-03	1.04E-04	5.07E-05	1.05	-	-	0.79	1.14	0.70	0.58	0.47
12	8	1.01E-03	9.54E-05	5.29E-05	1.05	-	-	0.82	1.11	0.70	0.57	0.50
12	9	7.31E-04	8.81E-05	5.51E-05	1.05	-	-	0.91	1.08	0.69	0.57	0.53
12	10	5.47E-04	8.19E-05	5.74E-05	-	-	-	0.93	1.07	0.69	0.57	0.55
12	11	4.22E-04	8.09E-05	6.03E-05	-	-	-	0.95	1.09	0.68	0.57	0.56

SUPPLEMENTAL TABLE 12 ^{195m}Pt

R_C	R_N	PENELOPE			$S_{PENELOPE}$ / S_{MIRD}			S_{ecc}/S_{conc}		S(AE+CK)/S(Tot)		
(μm)	(μm)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)	S(N←Cy)	S(N←CS)	S(N←N)	S(N←Cy)	S(N←CS)
3	1	6.22E-01	2.22E-02	7.32E-03	1.31	1.00	1.16	0.78	1.75	0.88	0.46	0.05
3	2	1.05E-01	1.67E-02	8.63E-03	1.22	1.05	1.04	0.86	1.28	0.79	0.42	0.18
4	2	1.05E-01	9.53E-03	4.43E-03	1.22	1.09	1.36	0.83	1.28	0.79	0.28	0.02
4	3	3.76E-02	8.10E-03	4.87E-03	1.20	1.11	1.11	0.90	1.16	0.70	0.31	0.12
5	2	1.05E-01	6.35E-03	2.66E-03	1.22	1.16	1.29	0.75	1.28	0.79	0.21	0.01
5	3	3.76E-02	5.27E-03	2.67E-03	1.20	1.13	1.20	0.83	1.19	0.70	0.20	0.01
5	4	1.83E-02	4.58E-03	2.93E-03	1.19	1.08	1.07	0.90	1.13	0.63	0.25	0.09
6	3	3.76E-02	3.70E-03	1.57E-03	1.20	1.13	1.07	0.79	1.31	0.70	0.15	0.01
6	4	1.83E-02	3.14E-03	1.65E-03	1.19	1.08	1.07	0.85	1.21	0.63	0.17	0.01
6	5	1.05E-02	2.82E-03	1.86E-03	1.18	1.05	1.02	0.90	1.13	0.57	0.22	0.08
7	3	3.76E-02	2.69E-03	8.78E-04	1.20	1.10	0.83	0.74	1.53	0.70	0.13	0.01
7	4	1.83E-02	2.29E-03	9.82E-04	1.19	1.06	0.94	0.81	1.27	0.63	0.13	0.01
7	5	1.05E-02	2.00E-03	1.08E-03	1.18	1.04	1.01	0.86	1.18	0.57	0.15	0.01
7	6	6.56E-03	1.85E-03	1.25E-03	1.16	1.02	0.99	0.92	1.11	0.54	0.20	0.07
8	4	1.83E-02	1.70E-03	5.63E-04	1.19	1.02	0.79	0.78	1.58	0.63	0.11	0.01
8	5	1.05E-02	1.49E-03	6.55E-04	1.18	1.01	0.91	0.81	1.31	0.57	0.11	0.01
8	6	6.56E-03	1.34E-03	7.47E-04	1.16	1.01	0.98	0.88	1.19	0.54	0.14	0.01
8	7	4.40E-03	1.28E-03	8.85E-04	1.14	1.01	0.98	0.92	1.11	0.51	0.19	0.07
9	5	1.05E-02	1.14E-03	3.88E-04	1.18	0.99	0.79	0.78	1.54	0.57	0.10	0.01
9	6	6.56E-03	1.03E-03	4.63E-04	1.16	1.00	0.90	0.83	1.28	0.54	0.10	0.01
9	7	4.40E-03	9.47E-04	5.39E-04	1.14	1.00	0.97	0.87	1.16	0.51	0.13	0.01
9	8	3.10E-03	9.25E-04	6.49E-04	1.12	1.00	0.97	0.93	1.10	0.49	0.18	0.07
10	5	1.05E-02	8.75E-04	2.34E-04	1.18	0.95	0.72	0.78	1.93	0.57	0.09	0.02
10	6	6.56E-03	7.95E-04	2.82E-04	1.16	0.97	0.79	0.80	1.52	0.54	0.09	0.01
10	7	4.40E-03	7.37E-04	3.41E-04	1.14	0.99	0.89	0.84	1.28	0.51	0.10	0.01
10	8	3.10E-03	6.93E-04	4.03E-04	1.12	0.99	0.96	0.88	1.17	0.49	0.12	0.01
10	9	2.28E-03	6.91E-04	4.90E-04	1.12	0.99	0.96	0.92	1.10	0.47	0.18	0.06
11	5	1.05E-02	6.88E-04	1.50E-04	1.18	-	-	0.76	2.33	0.57	0.08	0.02
11	6	6.56E-03	6.26E-04	1.76E-04	1.16	-	-	0.79	1.86	0.54	0.08	0.02
11	7	4.40E-03	5.78E-04	2.13E-04	1.14	-	-	0.82	1.50	0.51	0.09	0.02
11	8	3.10E-03	5.45E-04	2.59E-04	1.12	-	-	0.84	1.27	0.49	0.09	0.01
11	9	2.28E-03	5.24E-04	3.10E-04	1.12	-	-	0.89	1.16	0.47	0.12	0.02
11	10	1.72E-03	5.31E-04	3.81E-04	-	-	-	0.92	1.10	0.46	0.17	0.06
12	6	6.56E-03	4.97E-04	1.17E-04	1.16	-	-	0.79	2.28	0.54	0.08	0.02
12	7	4.40E-03	4.61E-04	1.37E-04	1.14	-	-	0.81	1.86	0.51	0.08	0.02
12	8	3.10E-03	4.36E-04	1.66E-04	1.12	-	-	0.82	1.52	0.49	0.08	0.02
12	9	2.28E-03	4.16E-04	2.03E-04	1.12	-	-	0.86	1.29	0.47	0.09	0.01
12	10	1.72E-03	4.07E-04	2.44E-04	-	-	-	0.89	1.18	0.46	0.11	0.02
12	11	1.33E-03	4.18E-04	3.02E-04	-	-	-	0.94	1.11	0.44	0.16	0.06

SUPPLEMENTAL TABLE 13 ^{201}Tl

R_C	R_N	PENELOPE			$S_{PENELOPE}$ / S_{MIRD}			S_{ecc}/S_{conc}		*S*(AE+CK)/*S*(Tot)		
(μm)	(μm)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)	*S*(N←Cy)	*S*(N←CS)	*S*(N←N)	*S*(N←Cy)	*S*(N←CS)
3	1	3.46E-01	8.64E-03	1.64E-03	1.22	0.94	0.76	0.72	2.95	0.89	0.73	0.22
3	2	5.44E-02	6.15E-03	2.49E-03	1.16	0.97	0.85	0.83	1.43	0.91	0.71	0.49
4	2	5.44E-02	2.97E-03	8.01E-04	1.16	0.93	0.93	0.81	2.03	0.87	0.58	0.12
4	3	1.81E-02	2.55E-03	1.16E-03	1.13	0.96	0.86	0.86	1.38	0.84	0.62	0.39
5	2	5.44E-02	1.69E-03	3.85E-04	1.16	0.93	0.99	0.78	2.29	0.87	0.50	0.04
5	3	1.81E-02	1.39E-03	4.35E-04	1.13	0.93	0.90	0.83	1.71	0.84	0.50	0.10
5	4	8.24E-03	1.29E-03	6.31E-04	1.12	0.95	0.87	0.87	1.29	0.81	0.57	0.34
6	3	1.81E-02	8.65E-04	2.19E-04	1.13	0.93	0.93	0.81	2.02	0.84	0.43	0.05
6	4	8.24E-03	7.54E-04	2.63E-04	1.12	0.92	0.91	0.85	1.60	0.81	0.46	0.09
6	5	4.44E-03	7.51E-04	3.87E-04	1.11	0.95	0.88	0.88	1.27	0.79	0.53	0.31
7	3	1.81E-02	5.81E-04	1.18E-04	1.13	0.93	0.86	0.80	2.61	0.84	0.39	0.06
7	4	8.24E-03	5.00E-04	1.43E-04	1.12	0.93	0.96	0.83	1.90	0.81	0.38	0.06
7	5	4.44E-03	4.61E-04	1.76E-04	1.11	0.93	0.94	0.84	1.54	0.79	0.42	0.09
7	6	2.68E-03	4.81E-04	2.58E-04	1.10	0.96	0.90	0.90	1.25	0.77	0.50	0.29
8	4	8.24E-03	3.51E-04	8.48E-05	1.12	0.93	0.94	0.82	2.27	0.81	0.35	0.07
8	5	4.44E-03	3.19E-04	1.02E-04	1.11	0.94	1.00	0.84	1.75	0.79	0.36	0.06
8	6	2.68E-03	3.06E-04	1.25E-04	1.10	0.94	0.96	0.87	1.48	0.77	0.40	0.09
8	7	1.74E-03	3.28E-04	1.83E-04	1.09	0.96	0.91	0.90	1.23	0.75	0.48	0.27
9	5	4.44E-03	2.31E-04	6.47E-05	1.11	0.94	1.00	0.83	2.05	0.79	0.32	0.07
9	6	2.68E-03	2.17E-04	7.67E-05	1.10	0.95	1.03	0.85	1.66	0.77	0.34	0.07
9	7	1.74E-03	2.14E-04	9.37E-05	1.09	0.95	0.98	0.87	1.45	0.75	0.38	0.09
9	8	1.20E-03	2.35E-04	1.35E-04	1.09	0.97	0.92	0.90	1.23	0.74	0.46	0.26
10	5	4.44E-03	1.77E-04	4.58E-05	1.11	0.95	1.09	0.83	2.10	0.79	0.30	0.08
10	6	2.68E-03	1.65E-04	5.09E-05	1.10	0.97	1.03	0.85	1.81	0.77	0.30	0.08
10	7	1.74E-03	1.57E-04	5.97E-05	1.09	0.96	1.07	0.86	1.54	0.75	0.32	0.07
10	8	1.20E-03	1.58E-04	7.24E-05	1.09	0.96	0.99	0.87	1.37	0.74	0.36	0.09
10	9	8.62E-04	1.75E-04	1.03E-04	1.09	0.97	0.93	0.91	1.19	0.73	0.45	0.25
11	5	4.44E-03	1.41E-04	3.57E-05	1.11	-	-	0.82	2.12	0.79	0.28	0.09
11	6	2.68E-03	1.29E-04	3.73E-05	1.10	-	-	0.84	1.90	0.77	0.28	0.09
11	7	1.74E-03	1.21E-04	4.12E-05	1.09	-	-	0.87	1.68	0.75	0.29	0.08
11	8	1.20E-03	1.18E-04	4.77E-05	1.09	-	-	0.88	1.48	0.74	0.30	0.08
11	9	8.62E-04	1.20E-04	5.74E-05	1.09	-	-	0.87	1.34	0.73	0.35	0.09
11	10	6.42E-04	1.34E-04	8.10E-05	-	-	-	0.90	1.18	0.72	0.44	0.24
12	6	2.68E-03	1.03E-04	2.95E-05	1.10	-	-	0.83	1.99	0.77	0.26	0.09
12	7	1.74E-03	9.63E-05	3.09E-05	1.09	-	-	0.87	1.82	0.75	0.27	0.09
12	8	1.20E-03	9.23E-05	3.39E-05	1.09	-	-	0.86	1.63	0.74	0.27	0.09
12	9	8.62E-04	9.10E-05	3.89E-05	1.09	-	-	0.88	1.46	0.73	0.29	0.08
12	10	6.42E-04	9.36E-05	4.66E-05	-	-	-	0.90	1.34	0.72	0.34	0.09
12	11	4.92E-04	1.06E-04	6.51E-05	-	-	-	0.50	1.19	0.71	0.23	0.23