Supplementary Table S2: Calculated Electrical Output Under Particle Radiation

Scintillation Conversion Parameters: Light yield: 10,000 photons/MeV (Ce doped, 5d to 4f transition, lambda=380 nm). Collection: 10% (graphene photon transport). Quantum efficiency: 20% (charge generation). Circuit efficiency: 85%. Combined: 1.7%.

Run	Particle	Energy	Angle	E_scint	Photons	Efficiency	Power
		(MeV)	(deg)	(MeV)	(10^4)	(%)	(W/m2)
P1	proton	10	0	0.0000	0.00	0.00	0.00e+00
P2	proton	100	0	6.4082	64.08	0.36	5.76e-02
P3	proton	1000	45	3.0926	30.93	0.02	2.78e-02
E1	electron	0.1	0	0.0000	0.00	0.00	0.00e+00
E2	electron	1	45	0.0003	0.00	0.00	2.70e-06
E3	electron	10	0	0.5783	5.78	0.32	5.20e-03
G1	gamma	0.1	0	0.0000	0.00	0.00	0.00e+00
G2	gamma	1	45	0.0291	0.29	0.16	2.62e-04
A1	alpha	25	0	0.0042	0.04	0.00	3.77e-05
A2	alpha	250	0	12.2202	122.20	0.27	1.10e-01
N1	neutron	1	0	0.0643	0.64	0.36	5.78e-04
N2	neutron	14	0	0.1686	1.69	0.07	1.52e-03
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AL1	proton (Al)	100	0	6.5074	65.07	0.37	5.85e-02
AL2	electron (Al)	10	0	1.9951	19.95	1.12	1.79e-02
AL3	neutron (Al)	1	0	0.0033	0.03	0.02	2.97e-05
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P2a	proton	100	15	6.6896	66.90	0.38	6.01e-02
P2b	proton	100	30	7.6631	76.63	0.43	6.89e-02
P2c	proton	100	45	10.0812	100.81	0.57	9.06e-02
P2d	proton	100	60	18.7781	187.78	1.05	1.69e-01

Notes: All 19 Geant4 runs (12 primary beam + 4 angular + 3 aluminium comparison). E_scint = energy deposited in scintillation layer per primary event. Efficiency = E_electrical / E_incident (%). Power = projected power density at 1x10^6 particles/(cm^2*s). AL1/AL2/AL3 = aluminium reference (21 mm). P2a/P2b/P2c/P2d = angular dependence (100 MeV proton). Conservative assumptions: 10% collection, 20% quantum, 85% circuit efficiency. Theoretical predictions from Geant4 energy deposition plus published scintillator physics; experimental particle-radiation validation is future work.