* Abstract
* Introduction:
  + HPGes/MCNP/Optimization Codes
  + Previous Work
  + The Problem:
  + Experimental Data
* Procedure:
  + Creating the Model
  + Creating the Code
* Results
  + Efficiency curves
  + Optimal Parameters
  + Adjoint Flux?
* Conclusions

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| **Gamma-Ray Energy [keV]** | **Nuclide** | **Activity [µCi]** | **Gammas per Second** |
| 60 | Am-241 | 0.02941 | 391.7 |
| 88 | Cd-109 | 0.2707 | 363.6 |
| 122 | Co-157 | 0.01019 | 322.7 |
| 159 | Te-123 | 0.01403 | 436.1 |
| 320 | Cr-51 | 0.3389 | 1236 |
| 392 | Sn-113 | 0.05109 | 1227 |
| 514 | Sr-85 | 0.06171 | 2247 |
| 662 | Cs-137 | 0.04325 | 1362 |
| 898 | Y-88 | 0.09633 | 3347 |
| 1173 | Co-60 | 0.05101 | 1885 |
| 1333 | Co-60 | 0.05101 | 1887 |
| 1836 | Y-88 | 0.09622 | 3539 |

* Energies were kept constant with manufacturer provided documentation
* Source Uncertainty for each energy was 3.1%

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| --- | --- | --- |
| **Material** | **Density [g/cm3]** | **Component(s)** |
| Mylar | 1.38 | IR Window |
| Brass | 8.41 | Metal Clasps |
| Aluminum | 2.7 | Detector Housing and Casing |
| Germanium | 5.32 | Ge Crystal |
| Lithium | 0.534 | Outer Deadlayer |
| Boron | 2.73 | Inner Deadlayer |
| Copper | 8.96 | Shield Lining |
| Tin | 7.31 | Shield Lining |
| Kapton Film | 1.42 | IR Window |
| Air | 0.001224 | Shielding Chamber |
| Lead | 11.34 | Shielding |
| Acrylic Glass | 1.19 | Source Encapsulation |
| Vacuum | --- | Coaxial Space |

\* All materials from LANLs ACE Data Tables, or PNNLs Compendium of Material Composition Data for Radiation Transport Modeling

|  |  |
| --- | --- |
| **Parameter** | **Initial Value** |
| Outer Top Deadlayer | 0.13 cm |
| Outer Sides Deadlayer | 0.13 cm |
| Ge Crystal Length | 8.32 cm |
| Kapton Window | 0.01016 cm |
| Inner Top Coaxial Deadlayer | 0.00003 cm |
| Inner Sides Coaxial Deadlayer | 0.00003 cm |
| Top Al Casing Thickness | 0.15 cm |
| Sides Al Casing Thickness | 0.15 cm |
| Ge Crystal Density | 5.32 g/cm3 |

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