

Abstract Submitted  
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**Measuring Positron Annihilation in NaI(Tl) Detectors as the Final Stage in a Carbon Diagnostic.**<sup>1</sup> MELISSA BRAATEN, CASSARAH BROWN, STEPHEN PADALINO, Physics and Astronomy, SUNY Geneseo, VLADIMIR GLEBOV, T. CRAIG SANGSTER, TIMOTHY DUFFY, LLE, University of Rochester — This study was performed to increase the detection efficiency of 511 keV annihilation radiation from decaying C-11 by indentifying and eliminating different forms of background radiation originating from the source and the ambient background in the gamma ray coincidence spectrum. Cu-64 was substituted for C-11 in this investigation since it could be easily made from Cu-63 via neutron capture using a PuBe neutron source. Using Cu-64, the effect of ambient background and source induced radiation in the NaI detectors was examined in three coincidence spectra. The spectra were generated by pairing the output signals of the three NaI(Tl) detectors and displaying them as two dimensional spectra. Different gamma ray background contributions to the coincidence spectrum were studied, including annihilation radiation from pair production in the detectors and the lead shielding. Detector geometries and source materials which modified the Compton scattering background were also investigated.

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