GAS-ČERENKOV DETECTOR FOR 10 TO 100 MeV GAMMA RAYS

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A gas-Čerenkov detector sensitive to gamma radiation above 10 MeV is currently undergoing final testing. The detector relies on the conversion and Compton scattering of gamma rays in a plastic scintillator and detecting the resulting electrons via the Čerenkov light they emit in a 2-m propane-gas column. Spectral information can be attained by varying gas pressure during the flight. The present detector is approximately 34″ in diameter, 91″ in length and weight 450 lb. At 20 MeV, an angular resolution of 6° half angle is expected. With an efficiency of 1 to 2%, a 10 hr balloon-borne system should achieve a point-source sensitivity of approximately 5×10^{-5}

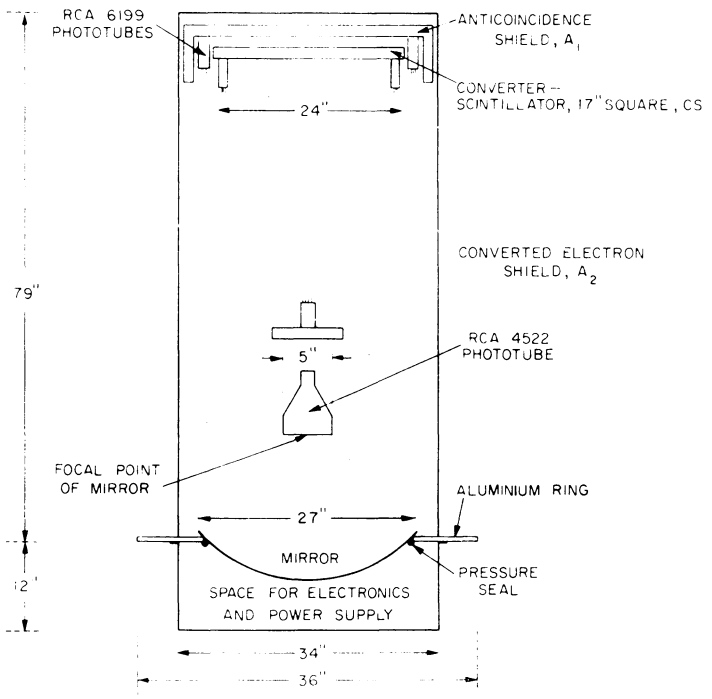

Figure 1. Diagram of preliminary gas-Čerenkov gamma-ray detector.

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photon $cm^{-2} s^{-1}$ above 20 MeV. A satellite version of the detector is expected to have a sensitivity of approximately 1.3×10^{-5} photon $cm^{-2} s^{-1}$ above 10 MeV for a 1-month galactic-plane scan mode. (Helmken and Hoffman, 1970.)

Reference

Helmken, H. and Hoffman, J.: 1970, *Nucl. Instr. Meth.* **80**, 125.

DISCUSSION

K. Pinkau: What is the converter thickness you use to obtain your resolution of $\sim 6^{\circ}$ at 20 MeV?

H. Helmken: The converter is a plastic scintillator, 17″ × 17″ and 1″ thick. The result is based on a Monte Carlo calculation.

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