Designing an Anti-Coincidence Shielding System for the ALFRED Project

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An active shield instrument will detect X-rays present in the upper atmosphere, specifically in the range of 20-100 keV. It will use anti-coincidence detection to discriminate background radiation from desired signals within a field of view. It will be designed for use on the NASA HEROES balloon-borne X-ray telescope.

X-Ray Detection Method

An anti-coincidence detector eliminates background signals by using simultaneous detection as a means of removing false signals.

GEANT4 Simulations

GEANT4 (GEometry ANd Tracking) is modeling software distributed by CERN for simulating particles interacting with matter. The ALFRED team will use GEANT4 to evaluate the scintillator system and materials.

Instrument Overview

A pressurized vessel contains the anti-coincidence detection system, a data acquisition system, and an environmental control system.

Conclusion

Active shielding is important to the future of high energy radiation detection because it allows for lighter shields and more precise instrumentation.

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