

# Improvised Explosive Devices and cosmic rays

## Executive Summary

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### What is this contribution about?

We present theoretical results that suggest that **cosmic rays** can be used to **detect** the type of **anti-personal mines** used in Colombia.

### Why is it relevant/interesting?

- Homemade anti-personnel mines are **Improvised Explosive Devices** (IEDs) that **kill thousands of civilians every year**, spreading fear and disruption across affected communities.
- The **detection and dismantling** of such harmful devices **must alleviate** the consequences of the internal conflicts.

### What has been done?

- GEANT4 **simulation** of an ANFO sphere of  $\text{NH}_4\text{NO}_3$ +diesel, a **typical IED found in Colombia**, interacting with cosmic rays flux at the Bucaramanga level (959 m a.s.l.) as shown in fig. (a).
- Simulations considered IEDs **buried into different soil types**: **dry** soil model, two **humid** soils, and two **fertilized** soils.

### What is the result?

- Protons' energy led to an **excess** of around **0.58 MeV**.
- This **peak is quite pronounced** for all soil models (fig. (b), (c) and (d)), giving a clear **indication of the feasibility of using a cosmic ray-based detector** for detecting these type of **rustic explosive** in the different types of soils.

