Technical design Report
Group 4:

We propose a method to solve and explain one of the most important unsolved mysteries in physics: charge asymmetries in cosmic air showers.

For this, we require the following materials: wood (1), 4 scintillators (2) and a compass.

The measured quantity will be

$$A := \frac{N_+ - N_-}{N_+ + N_+},$$

where we define

$$\boxed{N_+} := \# \{ \text{events where } B \& C \}$$
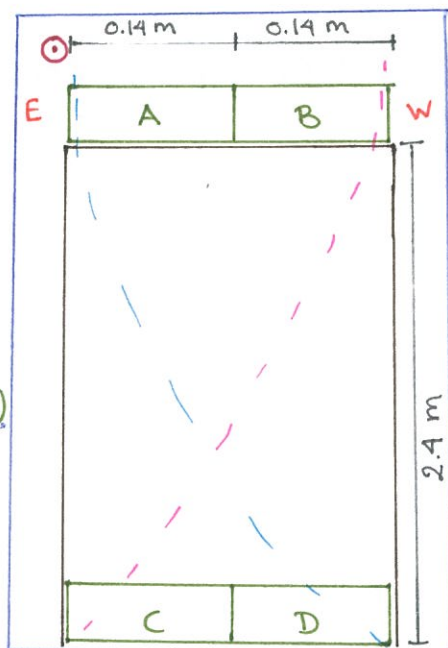$$\boxed{N_-} := \# \{ \text{events where } A \& D \}$$

Figure: Sketch of our proposed setup.

Through this momentum integrated quantity, we give the charge asymmetry, a (dimensionless in our Set-up).

~~The detector is sensitive to charged~~ Charged particles for which

$$\frac{|P|}{Z} > 100 \text{ keV}$$

fall into the geometrical acceptance of our detector, assuming a uniform magnetic field of the earth of 45 μT.

The relative efficiencies of detector parts A & B will be measured, and a measurement of its spatial dependence is planned. Systematics will include positioning of external structures, scintillator efficiencies and read-out electronics.