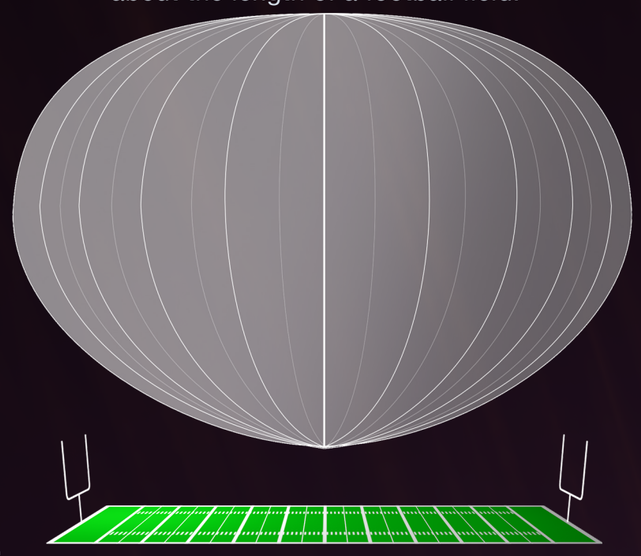
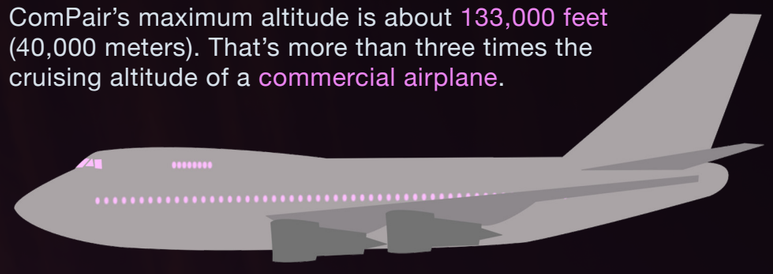
The width of the fully inflated balloon is 430 feet (130 meters), about the length of a football field.

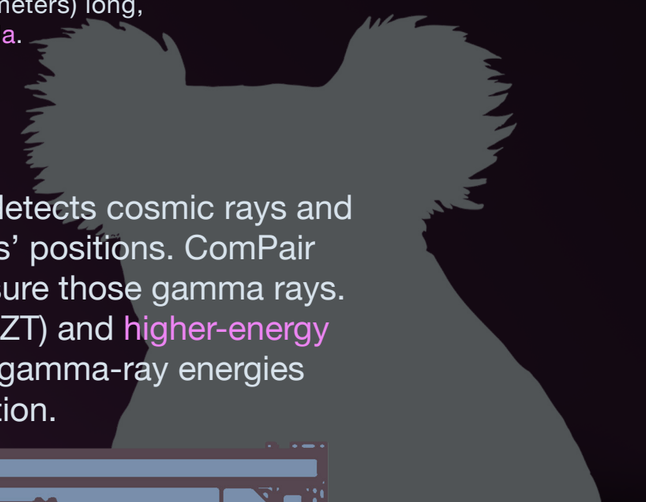
Expanding as it rises, the balloon's volume will grow to some 40 million cubic feet (1.1 million cubic meters) when it reaches maximum altitude. It's made from polyethylene film comparable in thickness to ordinary plastic sandwich wrap.



ComPair's maximum altitude is about 133,000 feet (40,000 meters). That's more than three times the cruising altitude of a commercial airplane.

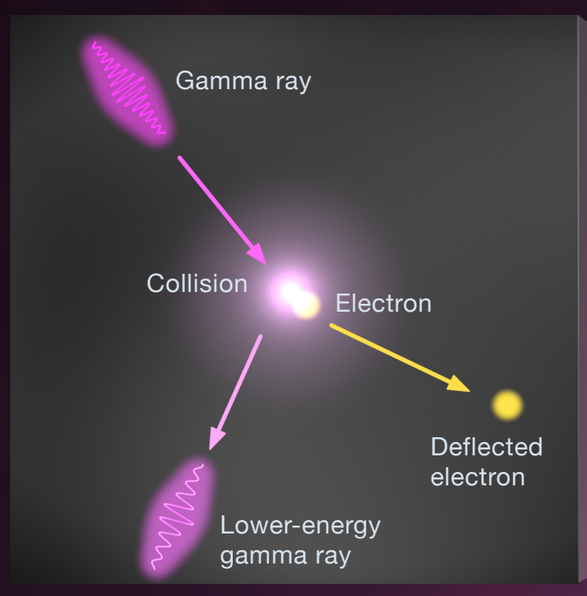


ComPair is about 2.4 feet (72 centimeters) long, or about the size of an average koala.



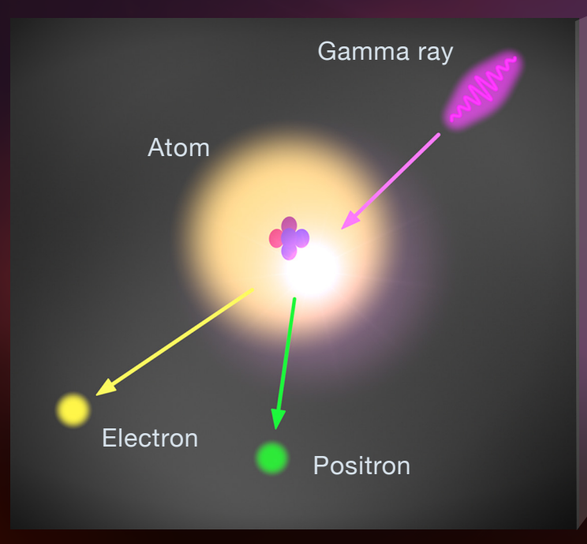
## COMPTON SCATTERING

A gamma ray hits an electron and transfers some of its energy to it, lowering its energy. The scattered electron, if tracked, can help scientists improve their knowledge of the original gamma ray's energy and direction



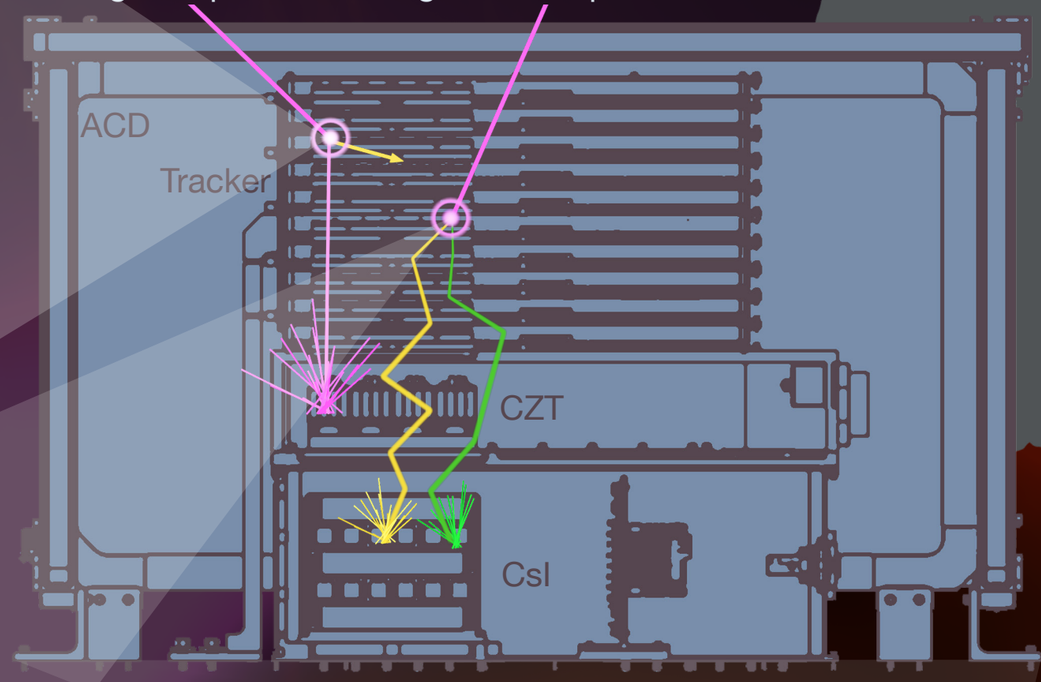

## PAIR PRODUCTION

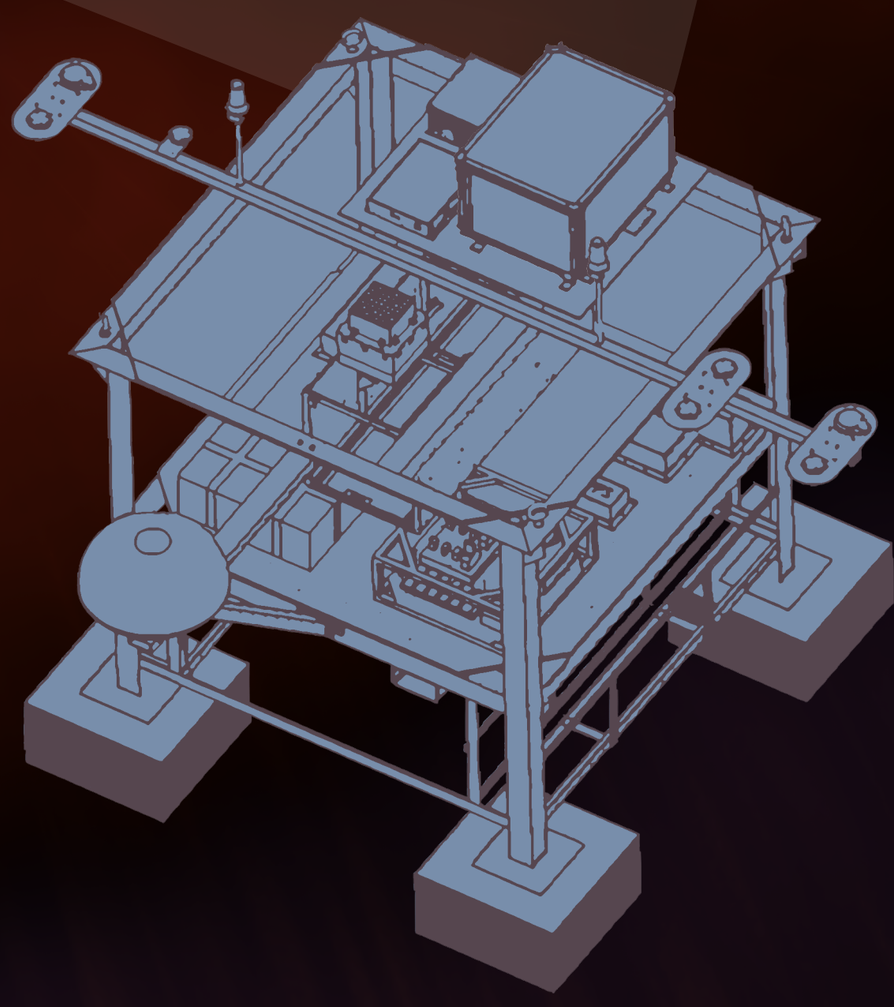
A gamma ray grazes an atomic nucleus and converts into a pair of particles: an electron and its antimatter twin, a positron. Backtracking the particles can reveal the original gamma-ray source.




## TWO METHODS

ComPair's anticoincidence detector (ACD) detects cosmic rays and its tracker determines incoming gamma rays' positions. ComPair uses two methods and instruments to measure those gamma rays. The lower-energy cadmium-zinc-telluride (CZT) and higher-energy cesium-iodide (CsI) calorimeters determine gamma-ray energies using Compton scattering. and Pair production.



Future ComPair-inspired instruments will detect gamma rays from some of the highest-energy sources in the universe and complement missions that search for harder-to-detect cosmic rays, neutrinos, and gravitational waves from the same objects.

Supermassive Black Holes

Merging Neutron Stars

Supernova Remnants

# ComPair

ComPair is a prototype gamma-ray instrument attached to a gondola and flown on a high-altitude balloon as a rideshare. The instrument will test new technologies for studying gamma rays, the highest-energy form of light.

## The Compton Pair balloon mission: a prototype all-sky gamma-ray instrument

National Aeronautics and Space Administration