

# Muon Tomography

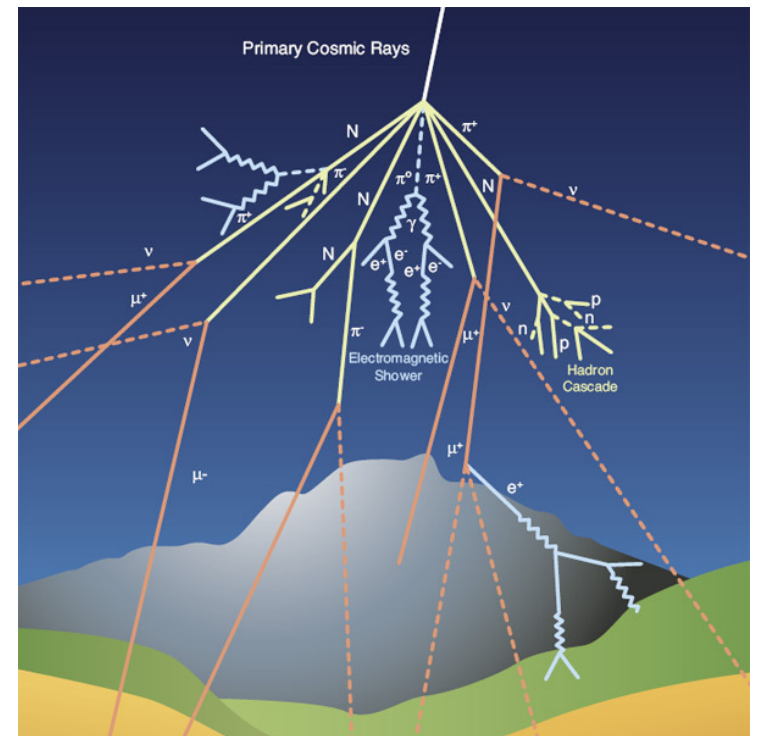
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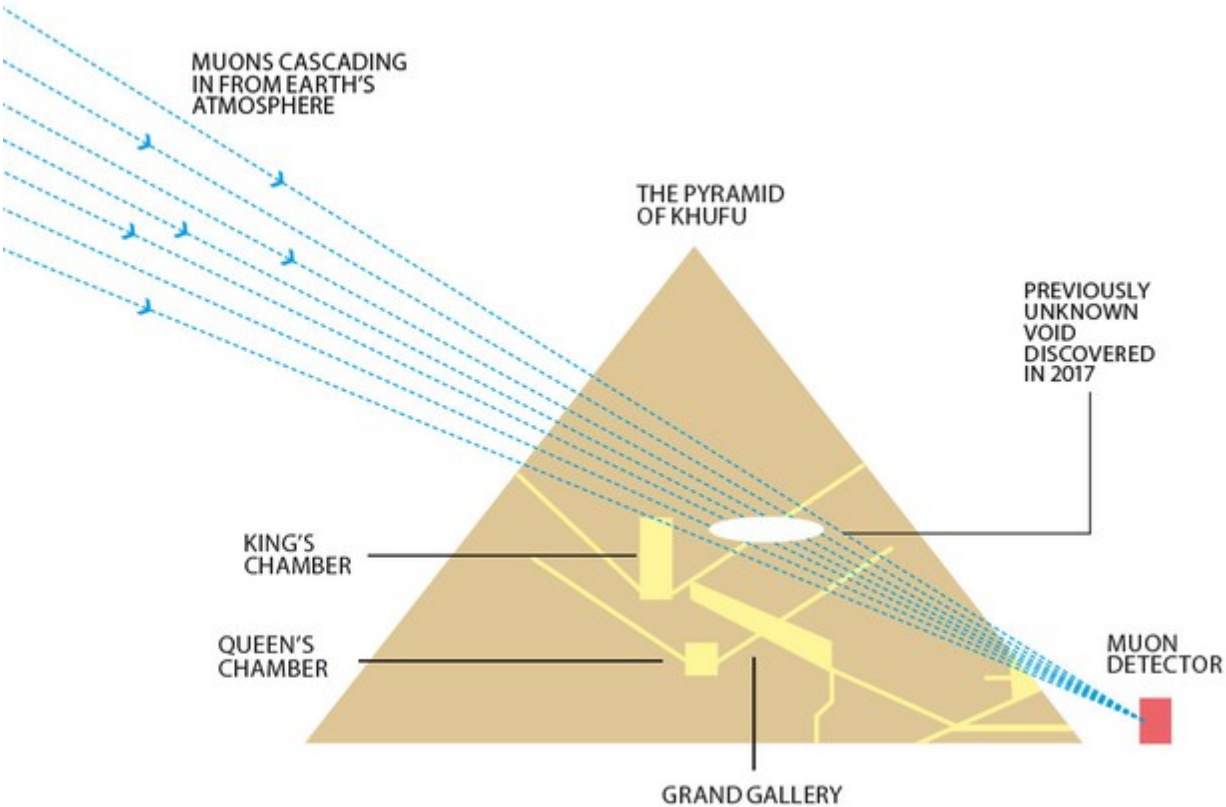
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# What is a muon?

- A muon is an elementary particle.
- They are created when a high-energy cosmic particle hits the upper atmosphere and produces a large shower of particles.
- Muons are more likely to reach the ground than electrons.
- 200 times heavier than an electron.
- They travel at almost the speed of light.
- They have a lifetime of  $2.2 \mu\text{s}$ .
- They can penetrate dense material without creating damage.
- 10000 muons/minute/m<sup>2</sup> reach the ground;



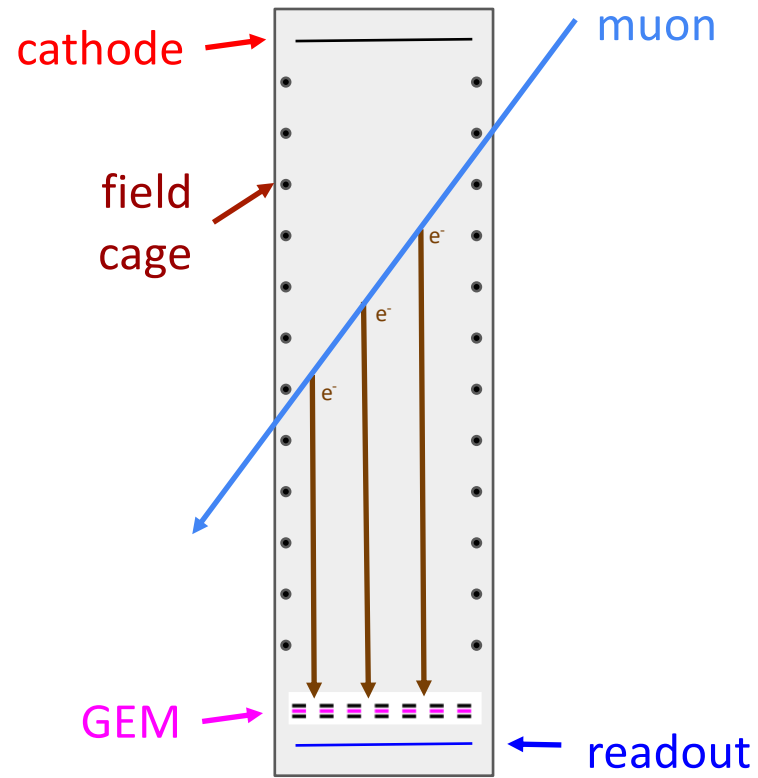
# Muons Can Be Used to X-ray Large Structures



# Applications

- Archeology – study of pyramids and tombs;
- Geology – study of volcanoes;
- Studies in Fukushima;
- Cargo inspection – Detection of high Z- material;
- Measuring the alignment of structures / stability of buildings
- We are interested in using it to discover mineral deposits underground

# Proposed Detector Schematic



# Triple GEM Muon detector and typical signals

