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Extensive Air Showers High Energy

Extensive air showers are a very unique phenomenon. In the more than six decades since their discovery by Auger et al. we have learned a great deal about these extremely energetic events and gained deep insights into high-energy phenomena, particle physics and astrophysics.

Extensive Air Showers: High Energy Phenomena and ...

Extensive Air Showers: High Energy Phenomena and Astrophysical Aspects - A Tutorial, Reference Manual and Data Book. Extensive Air Showers. : Peter K. F. Grieder. Springer Science & Business Media,...

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Extensive Air Showers | SpringerLink

2. OVERVIEW OF EXTENSIVE AIR SHOWERS. When a hadronic high-energy particle enters the Earth's atmosphere, it interacts with a nucleus from the air (mainly nitrogen, oxygen, and argon) at a typical height of 15 to 35 km and produces a shower of secondary particles. The most frequently produced secondary hadrons are charged and neutral pions.

Extensive Air Showers and Hadronic Interactions at High Energy

EXTENSIVE AIR SHOWERS AND HIGH ENERGY INTERACTIONS. A.D. Erlykin (LPI, Moscow (main)) 1994. 12 pages. Contribution to: International Symposium on Cosmic Ray Physics in Tibet, 74-85; ... EXTENSIVE AIR SHOWERS ACCOMPANIED BY FAMILIES WITH SIGMA E (gamma, H) => 10-TeV AND COMPARISON WITH THE GENERAL EAS. Y. Fukushima (Konan U.), C. Hamayasu

EXTENSIVE AIR SHOWERS AND HIGH ENERGY INTERACTIONS - INSPIRE

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discovery of extensive air showers in 1938, however, radically changed this situation with the highest energy being pushed up by about 5 orders of magnitude, probably the single largest advance to our knowledge of energy scales ever made. It is now known that the energy spectrum extends to beyond 10²⁰ eV but it has taken over 60

Extensive Air Showers and Ultra High-Energy Cosmic Rays: A ...

MC studies indicate that the two deeps observed around 90° and 270° in the azimuth distribution of detected EAS disappear for high energy showers ($E > 10^{16.8}$ eV), as it is demonstrated in the bottom plot of Fig. 6.

Detection of high energy showers by the Astroneu extensive ...

Extensive Air Showers and the Physics of High Energy ...

Extensive Air Showers and the Physics of High Energy ...

At these energies, photon primaries entering the atmosphere develop an extensive air shower which is driven by electromagnetic processes with a poor muon component. The muon content of the air showers is one of the most promising observables that could lead to the best possible discrimination between photons and hadronic cosmic rays.

Implementing the De-thinning Method for High Energy Cosmic ...

Download PDF Abstract: We present a detailed modeling and computation methodology to determine the optical Cherenkov signals produced by upward-moving extensive air showers (EASs) induced by τ -leptons and muons, sourced from the interaction of high-energy astrophysical neutrinos interacting in the Earth. Following and extending the physics modeling and Cherenkov signal simulations ...

[2011.09869] Modeling of the Tau and Muon Neutrino-induced ...

The discovery of extensive air showers by Rossi, Schmeiser, Bothe, Kolhörster and Auger at the end of the 1930s, facilitated by the coincidence technique of Bothe and Rossi, led to fundamental contributions in the field of cosmic ray physics and laid the foundation for high-energy particle physics.

Extensive Air Showers and Ultra High-Energy Cosmic Rays: A ...

At energies greater than 10¹⁵ eV, cosmic-ray particles can be measured only indirectly by detecting the extensive showers of secondary particles they create in the Earth's atmosphere. A detailed simulation of these particle showers is needed to reconstruct the properties of the primary particles. Key to understanding extensive air showers is the modeling of hadronic multiparticle production at energies from the particle-production threshold up to 10²⁰ eV—far beyond the reach of man-made ...

Extensive Air Showers and Hadronic Interactions at High Energy

CORSIKA – an Air Shower Simulation Program CORSIKA (COsmic Ray Simulations for KASCADE) is a program for detailed simulation of extensive air showers initiated by high energy cosmic ray particles. Protons, light nuclei up to iron, photons, and many other particles may be treated as primaries.

CORSIKA - an Air Shower Simulation Program - KIT

CORSIKA (COsmic Ray Simulations for KASCADE) is a physics computer software for simulation of extensive air showers induced by high energy cosmic rays, i.e. protons and atomic nuclei, as well as Gamma rays (photons), electrons, and neutrinos. It may be used up to and beyond the highest

energies of 100 E eV.

CORSIKA - Wikipedia

An air shower is an extensive cascade of ionized particles and electromagnetic radiation produced in the atmosphere when a primary cosmic ray enters the atmosphere. When a particle, which could be a proton, a nucleus, an electron, a photon, or a positron, strikes an atom's nucleus in the air it produces many energetic hadrons. The unstable hadrons decay in the air speedily into other particles and electromagnetic radiation, which are part of the shower components. The secondary radiation rains d

Air shower (physics) - Wikipedia

Cosmic-ray air showers. Cosmic rays. The earth is hit by elementary particles and atomic nuclei of verylarge energies. Most of them are protons (hydrogen nuclei) and all sorts of nuclei up to uranium (although anything heavier thannickel is very, very rare). Those are usually meant when talkingabout cosmic rays.