



Astronomy Picture of the Day

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2023 December 5

Energetic Particle Strikes the Earth

Illustration Credit: [Osaka Metropolitan U./L-INSIGHT](#), [Kyoto U./Ryuunosuke Takeshige](#)

Explanation: It was one of the most energetic particles ever known to strike the Earth -- but where did it come from?

Dubbed [Amaterasu](#) after the [Shinto sun goddess](#), this particle, as do all [cosmic rays](#) that strike the [Earth's atmosphere](#), caused an [air shower](#) of electrons, protons, and other [elementary particles](#) to spray down onto the Earth below. In the [featured illustration](#), a cosmic ray [air shower](#) is pictured striking the [Telescope Array](#) in [Utah, USA](#), which recorded the [Amaterasu event](#) in 2021 May. Cosmic ray air showers are common enough that you likely have been in a [particle spray](#) yourself, although you likely wouldn't have noticed. The origin of this energetic particle, likely the [nucleus of an atom](#), remains a [mystery](#) in two ways. First, it is [not known](#) how any single particle or atomic nucleus can practically acquire [so much energy](#), and second, attempts to trace the particle back to where it originated did not indicate any likely potential source.