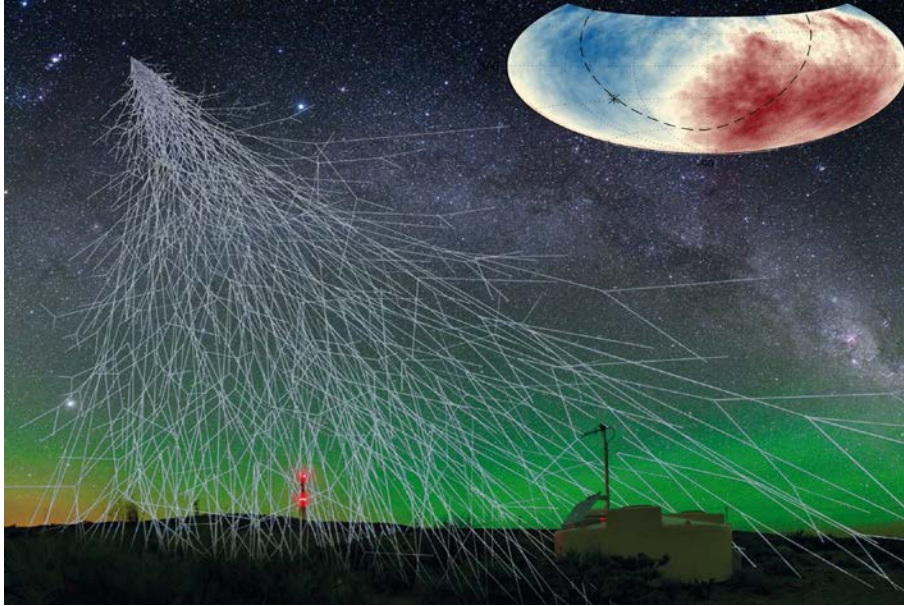


## Ultra-High Energy Cosmic Rays – Physics and Astrophysics of the Most Energetic Particles in Nature

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Ultra-High Energy Cosmic Rays (UHECR) are charged particles with energies reaching to beyond  $10^{20}$  eV. Still, 50 years after first successful observations, only very little is known about their nature, their sources and their location in the Universe, and about the mechanism by which they receive such enormous energies. The Pierre Auger Observatory located near the Andes mountains in Argentina has been conceived to address these questions. It covers an area of  $3000 \text{ km}^2$ , which makes it the world's largest cosmic ray observatory, and comprises an array of 1660 particle detectors and a set of 27 large area fluorescence telescopes. The data collected since 2008 have dramatically advanced our understanding of UHECRs. As an example, a strong suppression of the flux around  $5 \times 10^{19}$  eV is observed. Different from common wisdom, the end of the energy spectrum appears to be caused mostly by the limiting energy of the sources, rather than by interactions of the UHECR with the cosmic microwave background radiation (GZK-effect). Even though the UHECR sky turned out to be much more isotropic than expected, significant anisotropies start to emerge from the data and provide important information about the sources. We shall sketch the recent progress in this field and discuss the prospects for the next decade.