

# **Pierre Auger - The Largest Cosmic-Ray Detector Ever Built**

O. F. Taşcău and K.-H. Kampert

Bergische University, Wuppertal, Germany

The Pierre Auger Cosmic Ray Observatory (PAO) is studying ultra-high energy cosmic rays around and above the Greisen-Zatsepin-Kuzmin cutoff, i.e., at energies exceeding  $10^{19}$  eV, the most energetic particles in the universe. When these rare particles strike the earth's atmosphere, they produce extensive air showers made of billions of particles. While cosmic rays with low to moderate energies are well understood, those with extremely high energies remain highly mysterious. The PAO is the first experiment designed to work in a hybrid detection mode. The combination of two complementary detection techniques - 1600 water Cherenkov tanks distributed over 3000 km<sup>2</sup> and overlooked by 24 atmospheric fluorescence detectors - guarantees high-quality and statistically significant data. Therefore, it is hoped that the PAO will give answers to the most pressing astrophysical question existing for more than 40 years.