EAS SIMULATIONS AT AUGER ENERGIES WITH CORSIKA

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The Auger experiment [1] begins the exploration of the highest-energy cosmic rays with a prototype installation. Parallel to first measurements, a large data base of simulated extensive air showers (EAS) is generated with the CORSIKA code [2]. Since the detailed simulation of all produced secondary particles (of the order of 10^{13} secondaries in a 10^{20} eV shower) is impossible, thinning techniques are applied. The simulation strategy for the mass production is described. Generation and transport of individual fluorescence and Cherenkov photons is also prohibited by the huge number of photons, exceeding the particle number by more than 3 orders of magnitude. To allow for a realistic simulation of fluorescence and Cherenkov light in a second step, lateral and angular distributions and energy spectra of those particles producing the light are extracted at different levels along the shower axis. Taking into account the light production mechanisms and the propagation towards the detector, subsequently a detailed calculation of the fluorescence detector response can be carried out. Results and implications of the CORSIKA simulations are discussed.

[1] Auger Collaboration, *The Pierre Auger Observatory Design Report* (1997), http://www.auger.org
[2] D. Heck et al., *FZKA 6019*, Forschungszentrum Karlsruhe (1998), http://www-ik3.fzk.de/∼heck/corsika