SURFACE DETECTOR CALIBRATION FOR THE AUGER OBSERVATORY

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The ground array of the Pierre Auger Observatory will consist of 1600 water Cherenkov detectors arranged in a triangular grid with a spacing of 1.5 km. Each detector station contains 12 tons of clean water as Cherenkov radiator in a cylindrical volume of 3.6 m diameter and 1.2 m height. The detector walls are lined with tyvec as a diffuse reflector to homogenize the Cherenkov light. The light detection occurs via three photomultipliers of 20 cm diameter facing downward and arranged symmetrically on the water surface. The performance of the radiator, the reflector and the readout electronics have to be calibrated regularly. Due to the extent of the ground array and the rough terrain all detector stations have to be autonomous and maintenance free. This implies that the calibration method has to be simple and robust. It also has to be cost-effective since it will be implemented 1600 times. The electronics of the surface detector has high- and low-gain channels which have to be calibrated differently. The high-gain channels are calibrated using the signal from cosmic ray background muons as an absolute reference. The relative calibration between high-and low-gain channels is done using LED pulses. We present the details of the calibration and diagnosis scheme as well as first results obtained from the engineering array installed at the southern site of the Pierre Auger Observatory in Malargüe, Argentina.