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The AugerPrime upgrade of the Pierre Auger Observatory

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Operating since 2004, the Pierre Auger Observatory has yielded several important results. The suppression of the flux around 5×10^{19} eV is now confirmed without any doubt, a large-scale dipole anisotropy has been found for energies above 8×10^{18} eV, as well as an indication for some intermediate-scale anisotropy at the highest energies. Furthermore, strong limits have been placed on ultra-high-energy photons and neutrinos. In order to elucidate the origin of the flux suppression at the highest energies and search for composition-enhanced anisotropies, the Auger Collaboration is currently upgrading the Observatory. In the framework of the upgrade, called AugerPrime, the array of 1660 water-Cherenkov detectors is equipped with plastic scintillators, allowing us to enhance the composition sensitivity. The station electronics is also upgraded, including better timing with up-to-date GPS receivers, higher sampling frequency, and increased dynamic range. Currently, more than 25% of the surface detectors have been upgraded, and the commissioning studies are well advanced.

In this paper, the design of the AugerPrime surface detectors will be presented, and the performance obtained from the analysis of the first data will be discussed.

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