Astrophysics > High Energy Astrophysical Phenomena

The exposure of the hybrid detector of the Pierre Auger Observatory

The Pierre Auger Collaboration

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The Pierre Auger Observatory is a detector for ultra-high energy cosmic rays. It consists of a surface array to measure secondary particles at ground level and a fluorescence detector to measure the development of air showers in the atmosphere above the array. The "hybrid" detection mode combines the information from the two subsystems. We describe the determination of the hybrid exposure for events observed by the fluorescence telescopes in coincidence with at least one water-Cherenkov detector of the surface array. A detailed knowledge of the time dependence of the detection operations is crucial for an accurate evaluation of the exposure. We discuss the relevance of monitoring data collected during operations, such as the status of the fluorescence detector, background light and atmospheric conditions, that are used in both simulation and reconstruction.

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