

AtmoHEAD: Atmospheric Monitoring for High-Energy Astroparticle Detectors



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From the Utah desert to the international space station: The evolution of atmospheric monitoring for astroparticle physics detectors

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The earth's atmosphere offers an enormous detector for cosmic rays. Without it, high energy particles could not generate air showers accompanied by profiles of detectable light. But once the light is created, these photons encounter a dynamic time-dependent medium through which they must propagate to reach the detector focal surface(s). Unraveling this process is a critical puzzle of a rich interdisciplinary nature. This talk will review some of the successes, lessons and challenges of atmospheric monitoring for optical cosmic ray detectors of increasing aperture and complexity. Using examples from various projects including Fly's Eye, HiRes, and the Pierre Auger Observatory, this talk will focus on methods and strategies to determine atmospheric transmission and end to end photometric calibration including the atmosphere. The aim of this review is to benefit atmospheric monitoring programs for cosmic ray and gamma ray experiments that are in the planning and conceptual stages.

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