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Modeling the Distribution of Arrival Directions of Ultra-High-Energy Cosmic Rays with Physically Motivated Functions AARON KANDEL, MIGUEL MOSTAFA, Pennsylvania State Univ, PIERRE AUGER COLLABORATION — The study of ultra-high-energy cosmic rays (UHECR) comprises a significant area of inquiry in modern astrophysics research. While hypotheses regarding the origin of UHECR exist, their sources are still unknown. Ongoing research uses the distribution of arrival directions to validate or refute the different source(s) hypotheses. The goal of this project is to model the distribution of the arrival directions of the observed cosmic rays using a function that accounts for the shower-producing interactions of the particles with the atmosphere. Using data from the Pierre Auger Observatory, the applicability of the proposed function is evaluated through a statistical analysis. This development allows new research to apply a two-parameter function when evaluating and simulating the distributions of arrival directions of UHECR.

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