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Application of Information Field Theory to UHECR Deflections in the Galactic Magnetic Field

Information Field Theory (IFT) offers a powerful framework for the analysis of experimental data. The fundamental objective of IFT is the reconstruction of continuous fields from noisy and sparse data. By combining Bayesian probabilities with computational techniques from quantum field theory and statistical mechanics, IFT allows for efficient inference in high-dimensional problems.

In this talk, we discuss the application of IFT to the arrival directions of ultra-high-energy cosmic rays (UHECRs). We introduce a forward model that connects the extragalactic illumination map of UHECRs to the observed arrival directions, accounting for deflections caused by the Galactic magnetic field. We apply the model to simulated arrival directions, demonstrating the capabilities and possibilities that IFT can provide.

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