MAGIC

Science of the Cosmos

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A Complete p-Laplacian Framework for MONDian Gravity

In this contribution, I will demonstrate how certain symmetries of the well-known p-Laplacian operator allow for its generalization into a more robust complete p-Laplacian operator. I will derive this operator from an action principle, ensuring the conservation of energy and momentum—a crucial requirement for any physically viable theory. Moreover, I will show that Modified Newtonian Dynamics (MOND) phenomenology admits a significantly simpler and more elegant description within this complete p-Laplacian framework. This reformulation not only deepens the mathematical foundation of MOND but also offers new insights into its gravitational behavior. Finally, I will discuss key astrophysical implications of this approach, including potential observable signatures and connections to galactic dynamics. This work opens a new perspective on alternative gravity theories, bridging rigorous mathematical structure with phenomenological applicability.

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