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Type: **Talk**

On the relationship between electromagnetic curvature and acceleration of charges

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Faraday introduced electric field lines as a powerful tool for understanding the electric force, and field lines are still used today in classrooms and textbooks teaching the basics of electromagnetism within the electrostatic limit. However, despite attempts at generalizing this concept beyond the electrostatic limit, there is currently no field line theory that can be consistent with the complete theory of electromagnetism.

This work will discuss the notion of covariant electromagnetic field lines. We will show that it naturally extends electric field lines to general relativistic systems and derive a closed-form formula for the field lines curvature.

The curvature of electromagnetic field lines completely determines the dynamics of any electric charge and may entail new insights regarding long-standing problems such as radiation-reaction and self-force. In particular, the electromagnetic field lines curvature has the attractive property of being non-singular everywhere, thus eliminates all self-field singularities without using renormalization techniques.

Time permitting, the relationship between field lines curvature to gravity and/or quantum system will be discussed.

Topic:

Topic: Cosmology, Astrophysics, Gravity, Mathematical Physics

Summary

A deep equivalence between the geometry of electromagnetic field lines and the dynamics of charges will be discussed.

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