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Precision String Phenomenology

Tuesday 8 July 2025 09:00 (30 minutes)

Calabi-Yau compactifications of string theory lead to quantum field theories in four dimensions with chiral matter. Calculating parameters of the low-energy effective theory in general compactifications requires the Ricci-flat metric on the Calabi-Yau manifold. Such metrics are not known analytically. In this talk, we discuss how to approximate the Ricci-flat metric using neural networks. The accuracy of the numerical metrics is assessed for K3 and the quintic threefold. In the standard embedding, we calculate Yukawa couplings for compactifications on various Calabi-Yau geometries and show the existence of hierarchies. This is an initial step toward a first principles calculation of particle masses from string theory.

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