Machine learning the topology and geometry of Calabi-Yau manifolds

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Zoom link will be sent separately.

Abstract: I explain how topological features of Calabi-Yau manifolds are machine learned using neural networks and sketch the construction of new Calabi-Yau geometries via genetic algorithms and reinforcement learning. Using physics informed neural networks, I construct numerical approximations to Ricci-flat Calabi-Yau metrics. This allows for the calculation of Yukawa couplings in the low-energy effective N=1 theories obtained upon heterotic compactification. In explicit examples, hierarchies arise from excursions away from symmetric points in complex structure moduli space.