



Gravity and Yang-Mills theory

<http://www.firstlight.cn> 2010-11-30

Three of the four forces of Nature are described by quantum Yang-Mills theories with remarkable precision. The fourth force, gravity, is described classically by the Einstein-Hilbert theory. There appears to be an inherent incompatibility between quantum mechanics and the Einstein-Hilbert theory which prevents us from developing a consistent quantum theory of gravity. The Einstein-Hilbert theory is therefore believed to differ greatly from Yang-Mills theory (which does have a sensible quantum mechanical description). It is therefore very surprising that these two theories actually share close perturbative ties. This article focuses on these ties between Yang-Mills theory and the Einstein-Hilbert theory. We discuss the origin of these ties and their implications for a quantum theory of gravity.

[存档文本](#)