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Perturbative quantum gravity from gauge theory

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In recent years it has become clear that gauge theory and gravity amplitudes exhibit remarkable simplicity and beautiful structures. Here I will discuss one such structure: a duality between color and kinematics in gauge theory amplitudes. The duality implies nontrivial relations between color-ordered partial tree amplitudes. Remarkably the duality dictates the construction of gravity amplitudes as a double copy of gauge theory kinematic factors, clarifying the Kawai-Lewellen-Tye relations of open and closed strings. Originally considered as a classical (tree-level) duality, here I will present evidence that the duality is valid at the quantum level as well.

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