General Relativity and Quantum Cosmology

A Deformed Poincare Invariance for Group Field Theories

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In the context of quantum gravity, group field theories are field theories that generate spinfoam amplitudes as Feynman diagrams. They can be understood as generalizations of the matrix models used for 2d quantum gravity. In particular Boulatov's theory reproduces the amplitudes of the Ponzano-Regge spinfoam model for 3d quantum gravity. Motivated by recent works on field theories on non-commutative flat spaces, we show that Boulatov's theory (and its colored version) is actually invariant under a global deformed Poincare symmetry. This allows to define a notion of flat/excited geometry states when considering scalar perturbations around classical solutions of the group field equations of motion. As a side-result, our analysis seems to point out that the notion of braiding of group field theories should be a key feature to study further in this context.

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