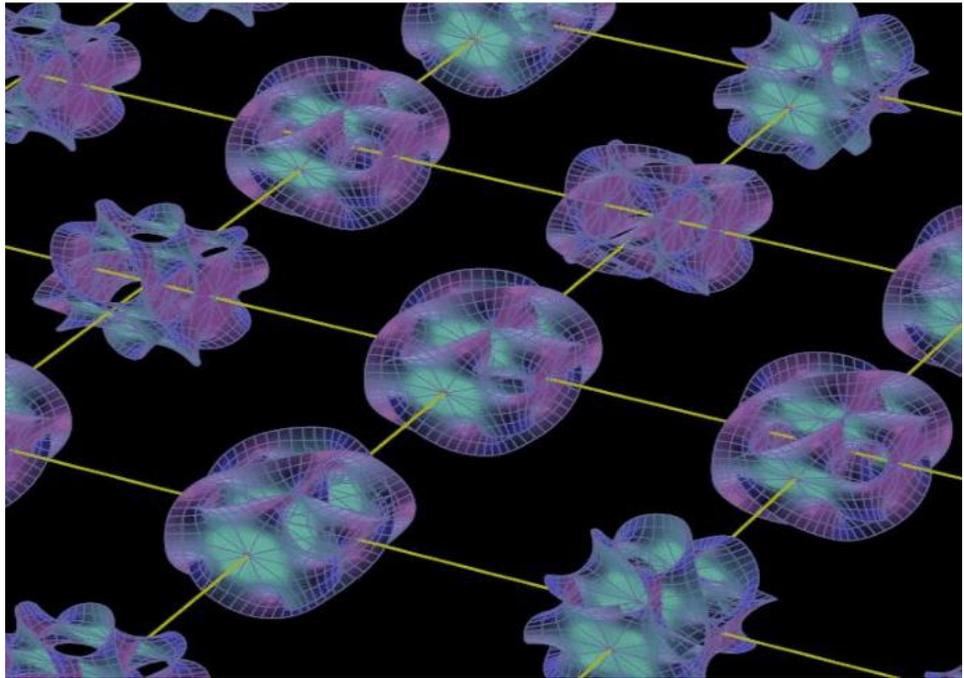




PHYSICS COLLOQUIUM



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Modified Commutators vs. Modified Operators in a Quantum Gravity Minimal Length Scale

Abstract

Generic theories of quantum gravity often postulate that at some high energy/momentum scale there will be a fixed, minimal length. Such a minimal length can be phenomenologically investigated by modifying the standard Heisenberg Uncertainty relationship. This is often done by modifying the position-momentum commutator, which in turn means modifying the position and momentum operators. However, modifications which change the uncertainty relationships lead to conflicts with observational data (e.g., gamma ray bursts). These observations seem to imply that there is no minimal length scale. Meanwhile, modifying the operators, such that the standard uncertainty relation retains the same form, leads to no such conflict with observational data. We show that it is this modification of the position and momentum operators that is the key determining factor in the existence (or not) of a minimal length scale.

**3:00 p.m. - 4:30 pm, Friday, April 29th,
In-Person: McLane 162**