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Quantum Gravity Phenomenology without Lorentz Invariance Violations

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In the last years the phenomenology of quantum gravity has been dominated by the search of violations of Lorentz symmetry. However, there are very serious arguments that led us to assume that Lorentz invariance is a real symmetry in Nature. This motivated us to construct a phenomenological model describing how a Lorentz invariant discrete structure of spacetime could become manifest. The proposal is fully observer covariant, it involves non-trivial couplings of curvature to matter fields and leads to a well defined phenomenology. In fact, an experiment specially designed to test the model has been performed by the Eöt-Wash group allowing to put bounds on some of the model's free parameters.