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## **Modified dispersion relations, generalized Bell nonlocality, quantum gravitational decoherence: windows to Planck-scale physics**

*Thursday, 5 October 2023 15:20 (20 minutes)*

We show how in phenomenological approaches to quantum gravity associated with fundamental length or energy scales, the propagation of particles is associated with dispersion relations characterized by additional terms or non-linearities. Deviations from ordinary dispersion relations provide essential signatures of Planck-scale physics and induce quantum gravitational effects, as modified Hamiltonian interactions that can be probed at accessible energy scales. For the specific case of electrons in external magnetic fields, we show that one such effect amounts to a modification of the anomalous magnetic moment of the electron, that can be measured and can thus constrain possible quantum gravitational effects. If time allows, we will discuss the implications of minimal length on Bell nonlocality, the structure of the spin operator and the relation between internal and spacetime degrees of freedom.

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