

# CPT and Decoherence in Quantum Gravity

*Thursday, 24 May 2007 09:00 (30 minutes)*

I will give an overview of theoretical reasons for expecting a possible violation of CPT symmetry in some models of Quantum Gravity and then I will proceed to discuss experimental signatures of such a violation. As CPT violation may be (but not necessarily) linked to Lorentz Invariance Violation (LIV), a sizeable portion of the talk will be devoted to tests of Lorentz symmetry violations, with emphasis on the case of neutral Kaons, which is of direct relevance to this conference. In the second part of the talk, I will discuss tests for CPT violation due to decoherence in some quantum gravity models, and I will explain how the latter can be disentangled from other effects, such as LIV. In this respect, I will describe some possibly unique (if exist) signatures of CPT violation through decoherence in entangled states of neutral mesons, produced at meson (such as  $\Phi$ - or  $B$ -) factories, and I will discuss briefly the relevant tests and sensitivities, including some theoretical estimates on the order of magnitudes of such effects.

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**Session Classification:** Session IV

**Track Classification:** CPT and QM tests