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Physical models from noncommutative causality

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We introduced few years ago a new notion of causality for noncommutative spacetimes directly related to the Dirac operator and the concept of Lorentzian spectral triple. This notion of causality corresponds to the usual one for commutative spectral triples and could be extended in order to get a full Lorentzian metric. We explored the noncommutative causal structure of several toy models as almost commutative spacetimes and Moyal-Weyl spacetime. From those models, we discovered some unexpected physical interpretations as a geometrical explanation of the 'Zitterbewegung' trembling motion of a fermion and geometrical constraints on translations and energy jumps of wave packets on Moyal spacetime.

Topic:

Workshop on "Noncommutative Geometry at the Forefront of Physics"

Summary

Author: FRANCO, Nicolas (University of Namur)

Presenter: FRANCO, Nicolas (University of Namur)

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