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Locally noncommutative space-times. (English) Zbl 1146.53071

Dito, Giuseppe (ed.) et al., Poisson geometry in mathematics and physics. Proceedings of the international conference, Tokyo, Japan, June 5–9, 2006. Providence, RI: American Mathematical Society (AMS) (ISBN 978-0-8218-4423-6/pbk). Contemporary Mathematics 450, 301-311 (2008).

Summary: A new concept for noncommutative space-times is reviewed: The noncommutativity is only present for small distances in the product space of pairs of points. Using a diffeomorphism of a small neighborhood of the diagonal to a neighborhood of the zero section of the tangent bundle the noncommutative structure is encoded using a vertical Poisson structure on TM together with a formal star product quantizing it. Several consequences of the verticality requirement are analyzed. After a detailed discussion of states also a C^*-algebraic version of the deformation is presented, based on Rieffel's quantization.

For the entire collection see [Zbl 1131.53002].

MSC:

53D50 Geometric quantization
53C50 Global differential geometry of Lorentz manifolds, manifolds with indefinite metrics
53D17 Poisson manifolds; Poisson groupoids and algebroids
58B34 Noncommutative geometry (à la Connes)

Keywords:

deformation quantization; vertical Poisson structure; formal star product