Mathematical Physics

Covariant star product on symplectic and Poisson spacetime manifolds

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A covariant Poisson bracket and an associated covariant star product in the sense of deformation quantization are defined on the algebra of tensor-valued differential forms on a symplectic manifold, as a generalization of similar structures that were recently defined on the algebra of (scalar-valued) differential forms. A covariant star product of arbitrary smooth tensor fields is obtained as a special case. Finally, we study covariant star products on a more general Poisson manifold with a linear connection, first for smooth functions and then for smooth tensor fields of any type. Some observations on possible applications of the covariant star products to gravity and gauge theory are made.

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