Im Oberseminar

Deformationsquantisierung

spricht am **23.10.2015 um 14 Uhr c.t.,**

im Seminarraum 00.009 (Physik Ost)

Thomas Weber

über das Thema:

Obstructions of Drinfeld Twist Deformation

One common topic in Hopf algebra technology is twist deformation. We recall the basic definitions and present how to deform a Hopf algebra via a Drinfeld twist. It turns out that furthermore every algebra which is a left module algebra for the undeformed Hopf algebra deforms to a left module algebra with respect to the deformed Hopf algebra. The deformed product can be written in terms of the twist and the module action. It's easy to generalize these constructions to quantized enveloping algebras. So we receive a mighty tool to construct new examples of products on algebras out of given ones. A natural question is now if every product (or star product) can be induced in this way. Of course one would suggest "No!", but in fact many examples of star products are of that form. Also this seems to be a non-trivial question since every Hopf algebra that acts on our algebra of interest could provide a twist that deforms a product of the algebra to the one we consider. There's a really nice approach to exclude some quantized enveloping algebras. The obstruction for twists shifts to solutions of the classical Yang-Baxter equation in the underlying Lie algebra. This connection to Lie bialgebras is surprising but also desirable since there are many classifications and results due to e.g. Drinfeld and Etingof. We might probably only sketch this point of view or shift it to another talk. Unfortunately this only rules out some module structures and gives no final answer to our question. So we proceed in another direction. If the algebra is the space of smooth functions on a connected compact symplectic manifold and a star product on it induced by a twist of a quantized enveloping algebra there's also a Lie algebra action on the manifold. We argue that this integrates to a Lie group action which is even transitive such that the manifold has the structure of a homogeneous space. Finally there's Mostow's characterization of compact homogeneous spaces by the Euler characteristic of the manifold. Having this in mind we can produce zillions of star products that can never be induced by a twist, e.g. any star product on a higher pretzel surface. So we have at least a countable infinity of counterexamples.

gez. Stefan Waldmann