Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

MUΦ
Lehrstuhl X

Announcement

Seminar on Deformation Quantization and Geometry

09. 01. 2026 at 14:00 s.t.

Seminarroom 31

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PB-algebroids vs VB-algebroids

Abstract: It is well known that the collection of linear frames of a smooth n-manifold M defines a principal $\mathrm{GL}(n,\mathbb{R})$-bundle over M (called the frame bundle); more generally, this construction makes sense for any vector bundle over M. Conversely, any principal bundle together with a representation induces an associated vector bundle; these processes establish therefore a correspondence between vector bundles on one side, and principal bundles with representations on the other side.

In differential geometry there are several natural instances where diagrams of Lie algebroids and vector bundles, together with suitable compatibilities, appear. They are known as vector bundle algebroids (VB-algebroids) and their theory has been fairly developed in the past decades, with applications e.g. to representations up to homotopy and Poisson geometry. On the other hand, little is known about the principal bundle counterpart of these objects.

In this talk, I will recall all the notions mentioned above, and then introduce a special class of frames of VB-algebroids which interact nicely with the algebroid structure. I will then discuss how to associate to any given VB-algebroid a diagram of Lie algebroids and principal bundles; this will lead to the general notion of a principal bundle algebroid (PB-algebroid).

I will then sketch how PB-algebroids arise by differentiating PB-groupoids and how this process is compatible with the recent correspondence between PB-groupoids and VB-groupoids. I will conclude by hinting at future applications.

This is joint work (in progress) with Alfonso Garmendia.

Invited by Madeleine Jotz