**THE UNIVERSITY**   **OF HONG KONG**

*Institute of Mathematical Research*
*Department of Mathematics*

# GEOMETRY SEMINAR

## Topological Lie bialgebra structures and their classification over g[[x]]

### Professor Alexander Stolin
Chalmers University of Technology and
University of Göteborg

**Abstract**

This talk is devoted to a classification of topological Lie bialgebra structures on the Lie algebra $g[[x]]$, where $g$ is a finite-dimensional simple Lie algebra over an algebraically closed field F of characteristic 0. We introduce the notion of a topological Manin pair $(L,g[[x]])$ and present their classification by relating them to trace extensions of $F[[x]]$. Then we recall the classification of topological doubles of Lie bialgebra structures on $g[[x]]$ and view the latter as a special case of the classification of Manin pairs. The classification of topological doubles states that up to some notion of equivalence there are only three non-trivial doubles. It is proven that topological Lie bialgebra structures on $g[[x]]$ are in bijection with certain Lagrangian Lie subalgebras of the corresponding doubles. We then attach algebro-geometric data to such Lagrangian subalgebras and, in this way, obtain a classification of all topological Lie bialgebra structures with non-trivial doubles. When F=C the classification becomes explicit. Furthermore, this result enables us to classify formal solutions of the classical Yang-Baxter equation.

The talk is based on a joint paper with Raschid Abedin, Stepan Maximov, and Efim Zelmanov.

| | |
|---|---|
| Date: | May 31, 2023 (Wednesday) |
| Time: | 3:00 – 4:00pm |
| Venue: | Room 210, Run Run Shaw Bldg., HKU |

*All are welcome*