Talk on September 24, 2024, 14:00 pm

Speaker: Prof. Gil Cavalcanti, University of Utrecht

Title: T-duality beyond torus bundles

Abstract:

Target-space duality, or T-duality for short, is a duality that comes from physics [2, 5] in the presence of a torus symmetry but also has very concrete mathematical formulations and consequences. In its simplest form, when the target-space is a Riemannian circle, it is marked by inversion of the radius of the circle and swapping of physical quantities (winding and momentum) to yield equivalent physical theories.

Mathematically, T-duality is made of two ingredients:

• Topological T-duality [1], relates the global topology of dual target-spaces: the back- ground form on one side influences the topology of the dual space, there are isomorphisms between the twisted cohomologies of T-dual spaces and also of their twisted K-theories.

• Geometric T-duality [3, 4] is an isomorphism of Courant algebroids over Tdual spaces that allows one to transport geometric structures between T-dual spaces.

This talk, based on work with A. Witte, B. Heemskerk and B. Uribe, we will review the basics of T-duality and delve into progresses in the cases when the torus action has fixed points and when one replaces the torus by non-Abelian objects, extending both topological and geometric T-duality.

References

[1] P. Bouwknegt, J. Evslin, and V. Mathai, T-duality: topology change from H-flux, Comm. Math. Phys. 249 (2004), no. 2, 383–415.

[2] T. Buscher, A symmetry of the string background field equations, Physics Letters B 194 (1987), no. 1, 59–62.

[3] G. R. Cavalcanti and M. Gualtieri, Generalized complex geometry and Tduality, A Cele- bration of the Mathematical Legacy of Raoul Bott (CRM Proceedings and Lecture Notes) (2010), 341–366.

[4] C. Klimčík and P. Ševera, Dual non-abelian duality and the Drinfel'd double, Phys. Lett. B 351 (1995), no. 4, 455–462.

[5] M. Roček and E. Verlinde, Duality, quotients, and currents, Nuclear Physics B 373 (1992), no. 3, 630–646.