Oberseminar Geometrie und Topologie

Sommersemester 2020

Dr. Andreas Vollmer

University of New South Wales/Sydney

Conformally superintegrable systems and the conformal equivalence of superintegrable systems

16. Juni 2020 – 16.15 Uhr
Seminarraum IGT, Raum 7.530, Pfaffenwaldring 57

Abstract: Second order superintegrable systems are Hamiltonian systems with a maximal amount of integrals of motion that are quadratic in the momenta. Stäckel transformations (also known as coupling constant metamorphosis) are a well-known equivalence operation of such systems. Conformally superintegrable systems are a generalisation of superintegrable systems, and Stäckel transformations are closely related to conformal transformations of these conformal systems.

The talk will introduce conformally superintegrable systems from a geometric point of view, which very naturally is adapted to the underlying conformal geometry. Other than existing approaches, which are limited to low dimensions, our framework can be used for systems in arbitrary dimension.

We find a structural tensor that is invariant under conformal transformations of the system, and we establish simple, algebraic equations on this tensor that govern a rich class of (conformally) superintegrable systems. We also find that superintegrable systems are obtained from special conformal scale choices, which in the case of the n-sphere arise from eigenfunctions of the Laplacian.
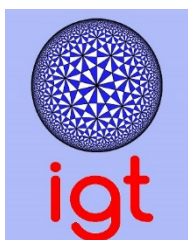
Institut für Geometrie und Topologie
Pfaffenwaldring 57
70569 Stuttgart