Quadratic differentials and circle patterns on complex projective tori

Wai Yeung Lam

Wed 23/10/2019, 14:45, Dissertantenzimmer (8th floor)

In the smooth theory, holomorphic quadratic differentials parametrize the space of complex projective structures on a Riemann surface via the Schwarzian derivative. It motivates the study of circle patterns on surfaces with complex projective structures, where circle patterns with prescribed intersection angles play a role of discrete conformal structures. Given a triangulation of a closed surface, we consider a cross ratio system that assigns a complex number to every edge satisfying certain polynomial equations per vertex. Every cross ratio system induces a complex projective structure together with a circle pattern. In particular, there is an associated conformal structure. We show that for any triangulated torus, the projection from the space of cross ratio systems with prescribed Delaunay angles to the Teichmueller space of the closed torus is a covering map with at most one branch point. Our approach is based on a notion of discrete holomorphic quadratic differentials.