Abstract

Higher Teichmuller theory studies the geometry and dynamical properties of surface groups representations into higher rank Lie groups. One of these higher Teichmuller spaces is the deformation space of GHMC anti-de Sitter structures, which corresponds to the component of maximal representations into PSL(2,R)xPSL(2,R), and can be parametrized by the cotangent bundle over Teichmuller space. In the first two lectures, we will explain how to obtain this parametrization and we will see the interplay between anti-de Sitter geometry, hyperbolic geometry and Teichmuller theory. In the last lecture, we will focus on anti-de Sitter manifolds that arize from polynomial holomorphic differentials on the complex plane. We will prove, in particular, that there is a homeomorphism between the moduli space of polynomial quadratic differentials on the complex plane and light-like polygons in the boundary at infinity of anti-de Sitter space.