Volumes of moduli spaces of hyperbolic surfaces

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Abstract

The moduli space of genus g hyperbolic surfaces with n geodesic boundary components of specified lengths comes equipped with a natural symplectic structure and hence a volume. Mirzakhani proved that the volume is a polynomial in the boundary lengths and showed that the coefficients in these polynomials are related to the intersection numbers on the compactified moduli space of genus g curves with n labeled points. This enabled her to reprove the Witten-Kontsevich theorem. I will explain this work and further consequences that the hyperbolic geometry has on the structure of the moduli space.