

Ecole Doctorale des Sciences Fondamentales

Title of the thesis: Geometry and fundamental group of low dimensional manifolds

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Summary :

Thurston's geometrization conjecture affirms that each 3-dimensional compact manifold decomposes into canonical pieces each admitting a homogenous metric. This conjecture suggests that the geometry and topology were closely intertwined in low dimensions. In 2002 and 2003 Grigori Perelman posted to the arXiv a series of eprints in which he realized Richard Hamilton's program for a proof of this conjecture.

The solution of the geomerization conjecture shows that the fundamental group plays an essential role in the understanding of 3-dimensional manifolds. Therefore it is natural to study representations of the fundamental group Γ of a low-dimensional manifold M into a Lie group G . Recall that the representation variety of Γ into $SL(2, \mathbb{C})$ was an essential tool in the development of the geometric topology in the last two decades. Not much is known about the representations of Γ into $SL(n, \mathbb{C})$, $n > 2$,

The aim of this theses project is to study representation spaces of the fundamental group of a hyperbolic 3-manifold into $SL(n, \mathbb{C})$, $n > 2$.