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 geometrization 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 \( \Gamma \) of a low-dimensional manifold \( M \) into a Lie group \( G \). Recall that the representation variety of \( \Gamma \) 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 \( \Gamma \) 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 \( SL(n, \mathbb{C}) \), \( n > 2 \).