

Oberseminar Topologie: 21.12.2020

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„Some aspects of the theory of Einstein metrics on 4-manifolds“

Abstract:

I will explain the convergence theory for degenerating sequences of Einstein 4-manifolds developed by Anderson-Cheeger, Bando-Kasue-Nakajima and Tian around 1990. Many more recent developments in geometric analysis have been concerned with extending the rough general features of this theory to higher dimensions or to other geometric PDEs.

Nevertheless, several very concrete problems have remained completely open for the Einstein equations in dimension 4, where the connections with topology are the strongest. I will focus on the structure of the possible bubbles and bubble trees in the 4-dimensional theory. In particular, I will review Kronheimer's classical work on gravitational instantons and present a recent result of Biquard-H concerning the renormalized volume of a 4-dimensional Ricci-flat ALE space.