Some topics in conformal geometry

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Abstract: The main purpose of this course is to give an introduction to asymptotically hyperbolic Einstein metrics. We describe some relations between conformally compact Einstein manifolds and their conformal infinities. Such correspondance is of great interest in both mathematics and theoretic physics, especially due to the AdS/CFT correspondence in theoretic physics.

1. Introduction to asymptotically hyperbolic Einstein metrics
2. Some rigidity results on asymptotically hyperbolic Einstein metrics
3. Existence of asymptotically hyperbolic Einstein metrics with prescribed conformal infinities sufficiently close to the standard spheres.
4. Compactness result and its application

Prerequisites: Riemannian geometry, Nonlinear analysis on manifolds

References:

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3. C. R. Graham and J. Lee, *Einstein metrics with prescribed conformal infinity on the ball.* Adv. Math. 87 (1991), no. 2, 186 - 225.
4. J. Lee, *Fredholm operators and Einstein metrics on conformally compact manifolds*, Mem. Amer. Math. Soc. 183 (2006), no. 864, vi+83 pp.
5. J. Qing, *On the rigidity for conformally compact Einstein manifolds*, IMRN Volume 2003, Issue 21, 1141-1153.