

GLUING CONSTRUCTIONS OF CANONICAL METRICS

MAT 644 FALL 18

Yang Mills Instantons

C. H. Taubes, Self-dual Yang Mills connections on non-self-dual 4-manifolds, Jour. Diff. Geom., **17**, (1982), 139-170.

Minimal and CMC surfaces in $\mathbb{R}^3, \mathbb{S}^3$.

(H. Wente Counterexample to a conjecture of H. Hopf, Pacific Journal of Mathematics, (1986), 121: 193-243).

N. Kapouleas, Complete constant mean curvature surfaces in Euclidean three space, Ann. of Math. (2) 131 (1990), 239-330

R. Mazzeo, D. Pollack, Gluing and Moduli for Noncompact Geometric Problems. 1996 arXiv:dg-ga/9601008.

R. Kusner, R. Mazzeo and D. Pollack, The moduli space of complete embedded CMC surfaces, GAFA, **6**, (1996), 120-137.

N. Kapouleas, Doubling and desingularization constructions for minimal surfaces, arXiv: 1012.5788

METRICS:

Constant scalar curvature.

Teichmüller Theory.

W. Thurston, The Geometry and Topology of Three-Manifolds, available online at:
library.msri.org/books/gt3m/

D. Joyce, Constant scalar curvature metrics on connected sums, Int. Jour. Math. & Math. Sci., **7**, (2003), 405-450, arXiv:math/0108022.

R. Mazzeo, D. Pollack and K. Uhlenbeck, Connected sum constructions for constant scalar curvature metrics, Topological methods in Nonlinear Analysis 6 (1995), 207-233. arXiv: dg-ga/9511018.

R. Schoen, The existence of weak solutions with prescribed singular behavior for a conformally invariant scalar equation, Comm. Pure and Appl. Math. XLI (1988), 317-392.

D. Pollack, Nonuniqueness and high energy solutions for a conformally invariant scalar equation. Comm. Anal. Geom. **1**, (1993), 347-414.

Self-dual Weyl curvature.

C. Taubes, The existence of anti-self-dual conformal structures, Jour. Diff. Geom., **36**, (1992), 163-253.

A. Kovalev and M. Singer, Gluing theorems for complete anti-self-dual spaces, GAFA, **11**, (2001), 1229-1281.

Metrics of special holonomy.

D. Joyce, Compact Riemannian 7-manifolds with holonomy G_2 , I, II, Jour. Diff. Geom., **43**, (1996), 291-328, 329-375.

M. Gross and P.M.H. Wilson, Large complex structure limits of K3 surfaces, Jour. Diff. Geom., **55**, (2000), 475-546.

Current hot topic. Too many to list

L. Foscolo, A. Kovalev, S. Donaldson, J. Nordstrom, M. Haskins, Hein-Sun-Viaclovsky-Zhang,

....

Constant scalar curvature Kähler.

C. Arezzo and F. Pacard, Blowing up and desingularizing constant scalar curvature Kähler manifolds, *Acta Math.*, **196**, (2006), 179-228.

Positive scalar curvature.

M. Gromov and H.B. Lawson, The classification of simply connected manifolds of positive scalar curvature, *Annals of Math.*, **111**, (1980), 423-434.

R. Schoen and S.T. Yau, On the structure of manifolds with positive scalar curvature, *Manuscripta Math.*, **28**, (1979), 159-183.

Positive Ricci curvature.

J.P. Sha and D.G. Yang, Positive Ricci curvature on the connected sums of $S^n \times S^m$, *Jour. Diff. Geom.*, **33**, (1991), 127-137.

M. Anderson, Short geodesics and gravitational instantons, *Jour. Diff. Geom.*, **31**, (1990), 265-275.

G. Perelman, Construction of manifolds of positive Ricci curvature with big volume and large Betti numbers, in: Comparison Geometry, MSRI Publ., **30**, (1997), 157-163.

Vacuum constraint equations in GR.

J. Corvino, Scalar curvature deformation and a gluing construction for the Einstein constraint equations, *Comm. Math. Phys.*, **214** (2000), 137-189.

J. Corvino and R. Schoen, On the asymptotics for the vacuum Einstein constraint equations. *J. Differential Geom.* 73 (2006), no. 2, 185-217.

P. Chrusciel, J. Isenberg and D. Pollack, Initial data engineering, *Comm. Math. Phys.*, **257**, (2005), 29-42.

General Einstein metrics.

M. Anderson, Dehn filling and Einstein metrics in higher dimensions, *Jour. Diff. Geom.*, **73**, (2006), 219-261.

O. Biquard, Polycopie on Differential Geometry and Global Analysis, Lecture notes, available at math.ens.fr/~biquard/dgga2007.pdf, 2007

O. Biquard, Desingularization de metriques d'Einstein, *Inventiones Math.*, **192**, (2013), 197-252.

J. Fine and B. Premoselli, Examples of compact Einstein four-manifolds with negative curvature, arXiv: 1802.00608.

S. Brendle and N. Kapouleas, Gluing Eguchi-Hanson metrics and a question of Page, *Comm. Pure App. Math.*, **70**, (2017), 1366-1401, arXiv: 1405.0056