BOSTON UNIVERSITY GEOMETRY SEMINAR

Quantitative Stratification and regularity for Einstein manifolds, harmonic maps and minimal surfaces.

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Wednesday Sep. 21, 4:30-5:30 pm in MCS B21. Tea 4:15-4:30 in MCS 153.

Abstract: In this talk we discuss new techniques for taking ineffective local, e.g. tangent cone, understanding and deriving from this effective estimates on regularity. Our primary applications are to Einstein manifolds, harmonic maps between Riemannian manifolds, and minimal surfaces. For Einstein manifolds the results include, for all p < 2, 'apriori' L^p estimates on the curvature |Rm| and the much stronger curvature scale $r_{|Rm|}(x) = maxr > 0$: $sup_{B_r(x)}|Rm| \le r^{-2}$. If we assume additionally that the curvature lies in some L^q we are able to prove that $r_{|Rm|}^{-1}$ lies in weak L^{2q} . For minimizing harmonic maps f we prove $W^{1,p} \cap W^{2,p/2}$ estimates for p < 3 for f and the stronger likewise defined regularity scale. These are the first estimates to break the L^2 barrier for the gradient. For minimizing hypersurfaces we prove L^p estimates for p < 7 for the second fundamental form and its regularity scale. The proofs include a new quantitative dimension reduction, that in the process stengthens hausdorff estimates on singular sets to minkowski estimates. This is joint work with Jeff Cheeger.