Convergence of manifolds under volume convergence, a tensor and a diameter bound
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In this talk we will deal with Intrinsic Flat convergence defined by Sormani and Wenger using work of Ambrosio and Kirchheim. This is a generalization of Federer and Fleming Flat convergence for currents.
We will show that given a closed and oriented manifold M and Riemannian tensors $g_0 \leq g_j$ on M that satisfy $vol(M, g_j) \to vol(M, g_0)$ and $diam(M, g_j) \leq D$ then (M, g_j) converges to (M, g_0) in the intrinsic flat sense. We note that under these conditions we do not necessarily obtain Gromov-Hausdorff convergence. We will show an analogous convergence result for manifolds with boundary. These results will be applied to show the stability of a class of tori with almost nonnegative scalar curvature and the stability of the positive mass theorem for a particular class of manifolds. [Based on joint work with Allen, Allen-Sormani, Cabrera Pacheco-Ketterer, Huang-Lee]