Meeting: 1001, Evanston, Illinois, SS 10A, Special Session on Differential Geometry

1001-53-9 **Simon P Morgan*** (morgan@math.umn.edu), Department of Mathematics, 127 Vincent Hall, 206 SE Curch St, Minneapolis, MN 55455. *Mixed Dimensional Compactness and* $\mathbb{R}^n X \mathbb{S}^{n-1}$ *Sphere Bundle Measures.*

N-1 dimensional Hausdorff measure on the $\mathbb{S}^{n-1}$ bundle of $\mathbb{R}^n$ can represent the normal or outward pointing vectors to a subset of $\mathbb{R}^n$ of codimension at least 1. This enables a common measure to represent rectifiable subsets of different dimensions. Treating the set of normal or outward pointing vectors as an n-1 rectifiable varifold or current (in $\mathbb{R}^n X \mathbb{S}^{n-1}$) yields compactness from Geometric Measure Theory. The limit current or varifold can then project down to yield a limit rectifiable set of possible mixed dimensions in $\mathbb{R}^n$.

This enables sets in $\mathbb{R}^n$ to contract down to lower dimensional sets while still being represented by a measure that does not go to zero. Hausdorff measure on $\mathbb{R}^n$ directly and general varifolds on $\mathbb{R}^n$ do both go to zero under such circumstances.

In this topology a sequence of unions of $\mathbf{C}^2$ j-rectifiable sets (j ranging from 0 to n-1) in $\mathbb{R}^n$ with uniformly finite mass boundariless lifts in $\mathbb{R}^n X \mathbb{S}^{n-1}$ converges to a union of rectifiable sets of mixed dimensions from 0 to n-1. (Received June 18, 2004)