1132-57-166 **Laurence R Taylor*** (taylor.2@nd.edu), Department of Mathematics, 255 Hurley Hall, Notre Dame, IN 46556. *Even manifolds.* Preliminary report.

Call a compact, orientable $4k$-dimensional manifold *even* if all squares from its middle dimensional integral cohomology to its top dimension are even. The starting point of this talk is to define a characteristic class for bundles, $\hat{v}_{2k}$, in dimension $2k$ such that a manifold is even if and only if this class is 0 for the tangent bundle.

Bundles with $\hat{v}_{2k} = 0$ can be classified by a space $BSO\langle\hat{v}_{2k}\rangle$. A lift of a bundle to $BSO\langle\hat{v}_{2k}\rangle$ is called a $\hat{v}_{2k}$-structure. A manifold is even if and only if its tangent bundle has a $\hat{v}_{2k}$-structure.

A manifold either is or is not even, but if it supports a $\hat{v}_{2k}$-structure, it typically supports many. By studying structures, evenness can sometimes be inferred from bundle computations.

Interesting results can also be obtained from studying $\hat{v}_{2\ell}$-structures on the tangent bundles of manifolds of dimension greater than 4ℓ. As an example, let M be a simply-connected, $(8k+4)$-dimensional compact *Spin* manifold with signature congruent to 16 mod 32. Suppose G is a finite 2-group which acts freely on M. Then $G = \mathbb{Z}/2\mathbb{Z}$ or $G = \mathbb{Z}/2\mathbb{Z} \oplus \mathbb{Z}/2\mathbb{Z}$. (Received July 20, 2017)