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A Topological Approach to Extensions of Oriented Matroids

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A 1978 result of Las Vergnas characterizes single-element extensions of an oriented matroid in terms of single-element extensions of its rank-2 minors on 3 elements. Las Vergnas's approach builds on a similar result due to Crapo for unoriented matroids: Las Vergnas simply examines how to incorporate signs into Crapo's picture.

On the other hand, when working with oriented matroids one literally does have a picture, or at least a very nice cell decomposition of a sphere, and it feels unnatural to use the abstract combinatorics of matroid theory to prove a result which seems intuitive from drawings on the two-dimensional sphere. This talk will give a largely visual proof of Las Vergnas's result and will discuss possible generalizations illuminated by this method.

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