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*Symplectic valuation theory and contact manifolds*

The Euclidean intrinsic volumes are a pivotal example of valuations which led to numerous important notions in convex, differential and integral geometry. Analogous canonic families of valuations were constructed fairly recently in different linear spaces, such as complex Hermitian space (Alesker, Bernig, Fu, Tasaki), pseudo-Euclidean space (Alesker, Bernig, Faifman), some quaternionic spaces (Bernig, Solanes) and a few others, all associated to representations of certain Lie groups. In this talk we let the real symplectic group be our guide. It will lead us to the Heisenberg algebra, where we construct some natural valuations analogous to the intrinsic volumes; we apply them to construct new invariants of manifolds in contact geometry, as well as to recover a Crofton formula for the gaussian curvature. We consider also the linear symplectic space, where the symplectic volumes substitute for the Euclidean intrinsic volumes, and present a Crofton formula in this setting.