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Integral geometry of isotropic spaces

The classical integral geometry of Blaschke, Santal, Chern and Federer takes place in euclidean space, but it is well-known that kinematic formulas exist whenever the ambient geometry has enough symmetries. More precisely, there are kinematic formulas expressible in terms of valuations, and also at the level of curvature measures, on any isotropic space; i.e. a Riemannian manifold under the isometric action of a group which is transitive on points and directions. These spaces have been classified and there is an ongoing program which aims to completely describe their integral geometry.

Thanks to a new approach developed by Bernig and Fu, and based on fundamental results by Alesker, this program has progressed significantly over the last years. In the talk we will report on its current status. In particular, we will describe the cases of complex space forms, the quaternionic plane, and the exceptional spheres S^6 and S^7, which is joint work with Bernig, Fu and Wannerer. Emphasis will be put in some unexpected phenomena that have been observed, as well as the methods, ideas, and questions that have emerged during these investigations.