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Towards b^k-analogues of Berezin-Toeplitz quantization

A b-manifold is a smooth manifold with a specified hypersurface; its b-tangent bundle (Melrose's terminology) has for sections those vector fields that are tangent to the hypersurface. Scott introduced higher-order generalizations of b-manifolds called b^k-manifolds. A slightly different approach to b^k-manifolds that allows for global holonomy phenomena was introduced by Francis and (independently) Bischoff-del Pino-Witte. Various classical geometries extend to these settings: b^k-manifolds can be complex, symplectic, Riemannian etc. Geometric quantization of symplectic b^k-manifolds has been the subject of recent work of Guillemin-Miranda-Weitsman, Braverman-Loizides-Song and others. For complex b^k-manifolds, one expects analogues of Berezin-Toeplitz quantization. Systematic study of complex b-manifolds was initiated by Mendoza. The Newlander-Nirenberg theorem for complex b-manifolds was obtained by Barron-Francis and extended to the b^k case by Francis. In this talk, we will survey what is known about complex b^k-manifolds and consider function spaces analogous to those relevant in Berezin-Toeplitz quantization.