

Michael Hitrik (U. California, Los Angeles)
Toeplitz operators and Bergman kernel asymptotics

The semiclassical analysis of Toeplitz/Bergman operators is a multifaceted subject, with applications ranging from physics and probability to complex analysis and geometry. In this talk, we shall describe some recent work in this direction, emphasizing the role played by complex microlocal techniques. In the first part of the talk, based on joint work with L. Coburn, J. Sjöstrand, and F. White, we shall discuss continuity conditions for Toeplitz operators acting on quadratic Bargmann spaces of entire functions, in connection with a conjecture by Berger–Coburn, relating Toeplitz and Weyl quantizations. The second part of the talk will be concerned with the semiclassical asymptotics for Bergman projections in more general Bargmann type spaces of holomorphic functions with exponential weights. We shall discuss a direct approach to the construction of asymptotic Bergman projections, developed jointly with A. Deleporte and J. Sjöstrand for real analytic weights, and with M. Stone for smooth weights. The direct approach allows us, in particular, to give a simple proof of a recent result due to O. Rouby, J. Sjöstrand, S. Vu Ngoc, and to A. Deleporte, stating that, in the analytic case, the Bergman projection can be described up to an exponentially small error.