Quantum harmonic analysis for polyanalytic Fock spaces

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For $k \in \mathbb{N}$ consider the true polyanalytic Fock space $F^2_{(k)}$, which consists of functions $f : \mathbb{C} \to \mathbb{C}$ that can be written as

$$f(z) = e^{|z|^2} \frac{\partial^{k-1}}{(\partial z)^{k-1}} \left(e^{-|z|^2} g(z) \right)$$

with g in the standard (analytical) Fock space $F^2 = F^2_{(1)}$. Toeplitz operators on these spaces sometimes behave differently than expected from the analytical case. For instance, there exist bounded non-zero symbols that generate the zero Toeplitz operator. Similarly, non-zero operators can have vanishing Berezin transform. This makes it more challenging, for example, to characterize compact operators on these spaces because the expected characterization in terms of the Berezin transform is no longer possible. In this talk I will explain how quantum harmonic analysis can be used to solve some of these problems and show some further results.

Based on joint work with Robert Fulsche [1].

[1] R. Fulsche, R. Hagger: *Quantum harmonic analysis for polyanalytic Fock spaces*, submitted, preprint on arXiv:2308.11292.