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Gelu F Popescu* (gelu.popescu@utsa.edu). *Multi-Toeplitz Operators Associated With Noncommutative Domains.*

We present recent results concerning multi-Toeplitz operators associated with noncommutative domains $\mathbf{D}_q^m(H) \subset B(H)^n$, $m, n \geq 1$, where $B(H)$ is the algebra of all bounded linear operators on a Hilbert space H . These operators are acting on the full Fock space with n generators and have as symbols free pluriharmonic functions on the interior of the domain. Several classical results from complex analysis concerning harmonic functions have analogues in our noncommutative setting. In particular, we show that the bounded free pluriharmonic functions are precisely those which are noncommutative Berezin transforms of multi-Toeplitz operators, and solve the Dirichlet extension problem in this setting.

We also present a Brown-Halmos characterization of the multi-Toeplitz operators associated with the noncommutative m -hyperball (the case when $q = Z_1 + \cdots + Z_n$, $m \geq 2$), which is a noncommutative version of Eschmeier and Langendörfer recent commutative result. Our result shows that the multi-Toeplitz operators are characterized by an algebraic equation involving the universal model (W_1, \dots, W_n) of the noncommutative m -hyperball. Many of these results admit extensions to poly-domains. (Received September 11, 2019)