MATTHIAS NEUFANG, Fields Institute, 222 College Street, Toronto, Ontario, M5T 3J1

The intrinsic group of a locally compact quantum group

Locally compact quantum groups (LCQGs), as introduced and studied by Kustermans–Vaes in 2000, provide a category which comprises both classical group algebras and group-like objects arising in mathematical physics such as Woronowicz's famous quantum group $SU_q(2)$. In joint work with M. Junge and Z.-J. Ruan, we have investigated the quantum group analogue of the class of completely bounded multiplier algebras which play an important role in Fourier analysis over groups, by means of a representation theorem. This result yields an interesting class of quantum channels, and enables us to express quantum group duality precisely in terms of a commutation relation for these channels. In this talk, I shall mainly focus on very recent work with my Ph.D. student M. Kalantar which shows that those quantum channels with noiseless error correction can be identified with the intrinsic group of the dual quantum group. We thus assign, to each LCQG, a locally compact group that is an invariant for the latter; this functor preserves compactness as well as discreteness (hence also finiteness), and, for large classes of quantum groups, amenability. For Woronowicz's class of compact matrix pseudogroups, we always obtain a compact Lie group—which in the case of $SU_q(2)$ is precisely the circle group. Combining our construction with the above-mentioned commutation result, we can further assign, to each LCQG, a certain subgroup of the circle group that forms a numerical invariant generalizing Heisenberg's bicharacters, and may be used towards a classification of LCQGs.