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*Derivations on non-tracial von Neumann algebras*

Given a non-tracial von Neumann algebra  $M$  with a fixed faithful normal state  $\varphi$ , one can study derivations on  $M$  as densely defined operators on the corresponding  $L^2$ -space. In the study of tracial von Neumann algebras, analyzing such derivations has proven to be a very successful strategy. This is in part because it allows one to bring to bear two very powerful theories: deformation/ rigidity and free probability. When a derivation on  $M$  is closable and interacts nicely with the modular automorphism group (i.e. is " $\mu$ -modular" for some  $\mu > 0$ ), one is able to replicate much of the analysis from the tracial context. In this talk, I will discuss results in this direction along with some examples.