1154-46-613 **Marc A. Rieffel***, rieffel@math.berkeley.edu. *Dirac operators for matrix algebras converging to coadjoint orbits.* Preliminary report.

In the high-energy quantum-physics literature one finds statements such as "matrix algebras converge to the sphere". Earlier I provided a general setting for understanding such statements, in which the matrix algebras are viewed as compact quantum metric spaces, and convergence is with respect to a quantum Gromov-Hausdorff-type distance. The general setting is matrix algebras converging to coadjoint orbits. But physicists want, even more, to treat structures on coadjoint orbits such as such as vector bundles, Riemannian metrics, and Dirac operators, and they want to approximate these by corresponding structures on matrix algebras.

Recently I have worked out what the corresponding "cotangent bundles" should be for the matrix algebras. These can then be used to define corresponding Riemannian metrics. I will very briefly indicate how some of this works. I am now trying to work out what the Dirac operators for the matrix algebras should be for the corresponding Riemannian metrics, and how they relate to the Dirac operators for the coadjoint orbits. (In the physics literature there are at least 3 inequivalent suggestions for what the Dirac operators on the matrix algebras should be in the case of the 2-sphere.) In my talk I will report on my findings. (Received September 08, 2019)