QUANTUM EQUIVALENT MAGNETIC FIELDS THAT ARE NOT CLASSICALLY EQUIVALENT

We construct pairs of compact Kähler-Einstein manifolds (M_i, g_i, ω_i) $(i = 1, 2)$ of complex dimension n with the following properties: The canonical line bundle $L_i = \bigwedge^n T^*M_i$ has Chern class $[\omega_i/2\pi]$, and for each positive integer k the tensor powers $L_1^{\otimes k}$ and $L_2^{\otimes k}$ are isospectral for the bundle Laplacian associated with the canonical connection, while M_1 and M_2 – and hence T^*M_1 and T^*M_2 – are not homeomorphic. In the context of geometric quantization, we interpret these examples as magnetic fields which are quantum equivalent but not classically equivalent. Moreover, we construct many examples of line bundles L, pairs of potentials Q_1, Q_2 on the base manifold, and pairs of connections ∇_1, ∇_2 on L such that for each positive integer k the associated Schrödinger operators on $L^{\otimes k}$ are isospectral.

This is joint work with Carolyn Gordon, William Kirwin, and David Webb.