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Positive line bundles over the irreducible quantum flag manifolds

Noncommutative Kähler structures were recently introduced by Ó Buachalla as a framework for studying noncommutative Kähler geometry on quantum homogeneous spaces. The notion of a positive vector bundle directly generalises to this setting. For covariant Kähler structures of irreducible type (those having an irreducible space of holomorphic 1-forms) we provide simple cohomological criteria for positivity, offering a means to avoid explicit curvature calculations. These general results are applied to our motivating family of examples, the irreducible quantum flag manifolds $O_q(G/L_S)$. Building on the recently established noncommutative Borel-Weil theorem, every covariant line bundle over $O_q(G/L_S)$ can be identified as positive, negative, or flat, and hence we can conclude that each Kähler structure is of Fano type. This is joint work with Díaz García, Ó Buachalla, Krutov, and Somberg.