

# Holomorphic structures on the quantum projective line

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In this talk I shall report on our joint ongoing work with Gianni Landi and Walter Van Suijlekom. We define a notion of holomorphic structure in terms of a bigrading of a suitable differential calculus over the quantum sphere. Realizing the quantum sphere as a principal homogeneous space of the quantum group  $SU_q(2)$  plays an important role in our approach. We define a notion of holomorphic vector bundle and endow the canonical line bundles over  $\mathbb{C}P_q^1$  with a holomorphic structure. We also define the quantum homogeneous coordinate ring of  $\mathbb{C}P_q^1$  and identify it with the coordinate ring of the quantum plane. Finally I shall formulate an analogue of Connes' theorem, characterizing holomorphic structures on compact oriented surfaces in terms of positive currents, in our noncommutative context. The notion of twisted positive Hochschild cocycle plays an important role here.