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*Homogenized quantum  $\mathfrak{sl}_2$  and its non-commutative geometry.*

For non-root-of-unity complex parameters  $q \in \mathbb{C}^\times$ , we realize the  $q$ -deformed enveloping algebra  $U_q = U_q(\mathfrak{sl}_2)$  as the coordinate ring of a non-commutative open subscheme of a “quantum  $\mathbb{P}^3$ ”. The latter is the dual object  $\text{Proj}_{nc}(S)$  corresponding to a graded algebra  $S$  with the Hilbert series of a 4-variable polynomial ring, equipped with a degree-two central element  $c$  such that the localization  $S[c^{-1}]_0$  is isomorphic to  $U_q$ .

We then show how the internal geometry of the noncommutative projective space  $\text{Proj}_{nc}(S)$  (i.e. its lines, points, so-called “fat points”, the incidence relations between these, etc.) mirrors and recovers the representation theory of  $U_q$  by recovering Verma modules, finite-dimensional irreducible modules, BGG resolutions, and so on. (Received June 21, 2016)