

Dumas, François; Jordan, David A.

The 2×2 quantum matrix Weyl algebra. (English) Zbl 0851.16025
Commun. Algebra 24, No. 4, 1409-1434 (1996).

The algebras of differentials on quantum affine spaces introduced by *G. Maltziniotis* [Calcul différentiel quantique, Groupe de travail, Université de Paris VII (1992)] have been studied from the point of view of noncommutative ring theory in a number of papers – e.g., *Akhavizadegan* and the second author [Prime ideals of quantized Weyl algebras (*Glasg. Math. J.*, to appear)]; *J. Alev* and the first author [*J. Algebra* 170, No. 1, 229-265 (1994; [Zbl 0820.17015](#))]; *G. Cauchon* [*J. Algebra* 180, No. 2, 530-545 (1996; [Zbl 0849.16028](#))]; *T. H. Lenagan* and the reviewer [*J. Pure Appl. Algebra* 111, 123-142 (1996)]; the second author [*J. Algebra* 174, No. 1, 267-281 (1995; [Zbl 0833.16025](#))]; and *L. Rigal* [*Beitr. Algebra Geom.* 37, No. 1, 119-148 (1996)]. Here the authors consider an algebra $W_{p,q}$ of differentials on two-parameter 2×2 quantum matrices defined by *G. Maltziniotis* [in *Commun. Math. Phys.* 151, No. 2, 275-302 (1993; [Zbl 0783.17007](#))], and investigate its similarities with the quantum Weyl algebras $A_{\bar{q},\Lambda}$ studied earlier. Similarities: $W_{p,q}$ has a simple localization of Krull and global dimension 4 obtained by inverting a finite set of normal elements, and this localization is isomorphic to a corresponding localization of an $A_{\bar{q},\Lambda}$ for suitable choices of parameters \bar{q}, Λ . Dissimilarity: $W_{p,q}$ has 3 height 1 primes, rather than 4 as in any $A_{\bar{q},\Lambda}$. In particular, $W_{p,q}$ is not isomorphic to any $A_{\bar{q},\Lambda}$. These properties of $W_{p,q}$ are derived by presenting the algebra as an iterated skew polynomial ring in such a way that a generalization of the techniques developed by the second author [ibid.] can be applied.

Reviewer: [K.R.Goodearl](#) (Santa Barbara)

MSC:

- 16S36 Ordinary and skew polynomial rings and semigroup rings
- 17B37 Quantum groups (quantized enveloping algebras) and related deformations
- 16D25 Ideals in associative algebras
- 16P40 Noetherian rings and modules (associative rings and algebras)
- 16P50 Localization and associative Noetherian rings
- 16P60 Chain conditions on annihilators and summands: Goldie-type conditions

Cited in **3** Documents

Keywords:

algebras of differentials on quantum affine spaces; 2×2 quantum matrices; quantum Weyl algebras; simple localizations; Krull and global dimensions; normal elements; height 1 primes; iterated skew polynomial rings

Full Text: [DOI](#)

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