Cauchon, G.

Prime quotients of $O_q(\mathfrak{m}_n(k))$. (Quotients premiers de $O_q(\mathfrak{m}_n(k))$.) (French) Zbl 0849.16028
J. Algebra 180, No. 2, 530-545 (1996).

Let k be a field and let R denote either $\mathcal{O}_q(M_n(k))$, the one-parameter quantized coordinate ring of $n \times n$ matrices over k, or $A_n^{\overline{q},\Gamma}(k)$, the multiparameter quantized Weyl algebra of degree n over k. In the first case, assume that the scalar $q \in k^\times$ is not a root of unity; in the second, assume that the multiplicative subgroup of $k^\times$ generated by the entries of the vector $\overline{q} \in (k^\times)^n$ together with the entries of the matrix $\Gamma \in M_n(k^\times)$ is torsionfree. It follows from a result of *E. S. Letzter* and the reviewer that all prime factor rings of R are integral domains [Proc. Am. Math. Soc. 121, No. 4, 1017-1025 (1994; Zbl 0812.16039)]. Here the author proves that the quotient division ring of any prime factor ring R/P has the form Fract $\mathcal{O}_{\mathbf{q}}(K^m)$, where $\mathcal{O}_{\mathbf{q}}(K^m)$ is the multiparameter quantized coordinate ring of affine m-space over a (commutative) field extension K of k. (The case $m = 0$ is allowed.) That Fract $\mathcal{O}_q(M_n(k))$ has this form had been shown by *G. Cliff* [J. Lond. Math. Soc., II. Ser. 51, No. 3, 503-513 (1995; Zbl 0835.16013)]. That Fract $A_n^{\overline{q},\Gamma}(k)$ has this form follows from work of *J. Alev* and *F. Dumas* [J. Algebra 170, No. 1, 229-265 (1994; Zbl 0820.17015)] and *D. A. Jordan* [J. Algebra 174, No. 1, 267-281 (1995; Zbl 0833.16025)].

Several authors have proved analogous results for the quotient division ring of $U_q(\mathfrak{g})^+$, the positive part of the quantized enveloping algebra of a semisimple Lie algebra $\mathfrak{g}$. See *J. Alev* and *F. Dumas* [op. cit.] *K. Iohara* and *F. Malikov* [Commun. Math. Phys. 164, No. 2, 217-237 (1994; Zbl 0826.17011)] and *A. Joseph* [C. R. Acad. Sci., Paris, Sér. I 320, No. 12, 1441-1444 (1995; Zbl 0847.17011)].

Reviewer: K.R.Goodearl (Santa Barbara)

MSC:

16S36	Ordinary and skew polynomial rings and semigroup rings
16U20	Ore rings, multiplicative sets, Ore localization
17B37	Quantum groups (quantized enveloping algebras) and related deformations
16K40	Infinite-dimensional and general division rings
16U10	Integral domains (associative rings and algebras)

Keywords:

quantized coordinate rings of $n \times n$ matrices; multiparameter quantized Weyl algebras; prime factor rings; integral domains; quotient division rings; multiparameter quantized coordinate rings; affine spaces; quantized enveloping algebras; semisimple Lie algebras

Full Text: DOI