R. Fioresi, F. Gavarini

"Quantum Duality Principle for Quantum Grassmannians"

in: *Quantum Groups and Noncommutative Geometry. Perspectives on Quantum Geometry*
pp. 80–95, M. Marcolli, D. Parashar (eds.), Aspects of Mathematics **E41**,
Vieweg+Teubner, Wiesbaden, 2011 — **DOI:** 10.1007/978-3-8348-9831-9_4

the original publication is available at
`http://www.springerlink.com/content/t64184631908j166/`

ABSTRACT

The quantum duality principle (QDP) for homogeneous spaces gives four recipes to obtain, from a quantum homogeneous space, a dual one, in the sense of Poisson duality. One of these recipes fails (for lack of the initial ingredient) when the homogeneous space we start from is not a quasi-affine variety. In this work we solve this problem for the quantum Grassmannian, a key example of quantum projective homogeneous space, providing a suitable analogue of the QDP recipe.

— — — — —

References

[1] N. Abe, *Hopf algebras*, Cambridge Tracts in Math. **74**, Cambridge Univ. Press, Cambridge, 1980.

[2] V. Chari, A. Pressley, *Quantum Groups*, Cambridge Univ. Press, Cambridge, 1994.

[3] N. Ciccoli, F. Gavarini, *A quantum duality principle for coisotropic subgroups and Poisson quotients*, Advances in Mathematics **199** (2006), 104–135.

[4] N. Ciccoli, F. Gavarini, *A global quantum duality principle for subgroups and homogeneous spaces*, work in progress.

[5] C. De Concini, D. Eisenbud, C. Procesi, *Young Diagrams and Determinantal Varieties*, Invent. Mathematicæ **56** (1980), 129–165.

[6] V. G. Drinfel'd, *Quantum groups*, Proc. Intern. Congress of Math. (Berkeley, 1986), 1987, pp. 798–820.

[7] L. D. Faddeev, N. Yu. Reshetikhin, L. A. Takhtajan, *Quantum groups*, in: M. Kashiwara, T. Kawai (eds.), *Algebraic Analysis*, Academic Press Boston, 1989, pp. 129–139.

[8] R. Fioresi, *Quantum deformation of the Grassmannian manifold*, J. Algebra **214** (1999), 418–447.

[9] R. Fioresi, *A deformation of the big cell inside the Grassmannian manifold $G(r, n)$*, Rev. Math. Phys. **11** (1999), 25–40.

[10] F. Gavarini, *The quantum duality principle*, Annales de l'Institut Fourier **52** (2002), 809–834.

[11] ———, *The global quantum duality principle: theory, examples, and applications*, preprint `http://arxiv.org/abs/math.QA/0303019` (2003).

[12] ———, *The global quantum duality principle*, Journal für die reine und angewandte Mathematik, 13 pages (to appear).

[13] K. Goodearl, T. Lenagan, *Quantum Determinantal Ideals*, Duke Math. J. **103** (2000), 165-190.

[14] V. Lakshmibai, N. Reshetikhin, *Quantum flag and Schubert schemes*, Contemp. Math. **134** (1992), Amer. Math. Soc., Providence, RI, 145–181.

[15] B. Parshall, Wang Jian-Pan, *Quantum linear groups*, Mem. Amer. Math. Soc. **89** (1991).

[16] E. Taft, J. Towber, *Quantum deformation of flag schemes and Grassmann schemes, I. A q-deformation of the shape-algebra for $GL(n)$*, J. Algebra **142** (1991), 1–36.