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"Quantum duality principle for coisotropic subgroups and Poisson quotients"

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ABSTRACT

We develop a quantum duality principle for coisotropic subgroups of a (formal) Poisson group and its dual: namely, starting from a quantum coisotropic subgroup (for a quantization of a given Poisson group) we provide functorial recipes to produce quantizations of the dual coisotropic subgroup (in the dual formal Poisson group). By the natural link between subgroups and homogeneous spaces, we argue a quantum duality principle for Poisson homogeneous spaces which are Poisson quotients, i.e. have at least one zero-dimensional symplectic leaf.

Only bare results are presented, while detailed proofs can be found in [3].

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References

[1] M. Bordemann, G. Ginot, G. Halbout, H.-C. Herbig, S. Waldmann, *Star-répresentation sur des sous-varietés coïsotropes*, preprint (2003); electronic version on `arXiv: math.QA/0309321`.

[2] A. Cattaneo, G. Felder, *Coisotropic submanifolds in Poisson geometry, branes and Poisson σ–models*, Lett. Math. Phys. **69** (2004), 157–175.

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

[4] M. S. Dijkhuizen, T.H. Koornwinder, *Quantum homogeneous spaces, duality and quantum 2–spheres*, Geom. Dedicata **52** (1994), 291–315.

[5] M. S. Dijkhuizen, M. Noumi, *A family of quantum projective spaces and related q–hypergeometric orthogonal polynomials*, Trans. Amer. Math. Soc. **350** (1998), 3269–3296.

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

[7] V. G. Drinfel'd, *On Poisson homogeneous spaces of Poisson-Lie groups*, Theoret. and Math. Phys. **95** (1993), 524–525.

[8] P. Etingof, D. Kazhdan, *Quantization of Lie bialgebras, I*, Selecta Math. (N.S.) **2** (1996), 1–41.

[9] ———, *Quantization of Poisson algebraic groups and Poisson homogeneous spaces*, Symétries quantiques (Les Houches, 1995), North-Holland, Amsterdam, 1998, pp. 935–946.

[10] S. Evens, J.-H. Lu, *On the variety of Lagrangian subalgebras. I*, Ann. Sci. École Norm. Sup. (N.S.) **34** (2001), 631–668.

[11] F. Gavarini, *The quantum duality principle*, Ann. Inst. Fourier (Grenoble) **52** (2002), 809–834.

[12] ———, *The global quantum duality principle*, J. reine angew. Math. (to appear) — see also `arXiv: math.QA/0303019` (2003).

[13] J. H. Lu, *Multiplicative and affine Poisson structures on Lie groups*, Ph.D. thesis University of California, Berkeley (1990).

[14] J. H. Lu, A. Weinstein, *Poisson-Lie groups, dressing transformations and Bruhat decompositions*, J. Diff. Geom. **31** (1990), 501–526.

[15] A. Masuoka, *Quotient theory of Hopf algebras*, in: Advances in Hopf algebras, Lecture Notes in Pure and Appl. Math. **158** (1994), 107–133.

[16] A. Weinstein, *The local structure of Poisson manifolds*, J. Differential Geometry **18** (1983), 523–557.

[17] S. Zakrzewski, *Poisson homogeneous spaces*, in: J. Lukierski, Z. Popowicz, J. Sobczyk (eds.), *Quantum groups (Karpacz, 1994)*, PWN, Warszaw, 1995, 629–639.