

Scientific report on the development of the project in

October 2011- October 2013

Abstract: In the past two years we published 15 papers in ISI journals and 1 paper in a Proceeding of an international conference (Contemporary Math. AMS, Vol. 585, 2013). Other 8 papers were submitted for publication by the members of the research team.

Papers published/accepted for publication:

The stage 2012:

[1] A.L. Agore, S. Caenepeel, G. Militaru – The center of the category of bimodules and descent data for non-commutative rings, *J. Algebra Appl.* 11 (2012), 1-17. (IF: 0.483)

See the 2011 report for a short abstract.

[2] G. Militaru – Representable functors for corings, *Comm. Algebra* 40 (2012), no.5, 1766-1796. (IF: 0.347)

See the 2012 report for a short abstract.

[3] A. L. Agore and G. Militaru – Schreier type theorems for bicrossed products, *Cent. Eur. J. Math.* 10 (2012), no.2, 722-739. (IF: 0.440)

See the 2011 report for a short abstract.

[4] A.L. Agore, S. Caenepeel, G. Militaru – Braidings on the category of bimodules, Azumaya algebras and epimorphisms of rings, *Applied Cat. Structures*, 22 (2014), 29–42 (IF: 0.600)

See the 2011 report for a short abstract.

[5] A. L. Agore, C. G. Bontea, G. Militaru – Classifying bicrossed products of Hopf algebras, *Algebr. Represent. Theory*, 17(2014), 227-264 (IF: 0.595).

See the 2012 report for a short abstract.

[6] S. Burciu – Subgroups of odd depth – a necessary condition, *Czechoslovak Math. J.*, 63(2013), 1039-1048 (IF: 0.262)

See the 2012 report for a short abstract.

[7] A. L. Agore, G. Militaru – Unified products and split extensions of Hopf algebras, *Contemporary Math. AMS*, Vol. 585 (2013), 1-15.

See the 2011 report for a short abstract.

The stage 2013:

[1] S. Burciu, S. Natale – Fusion rules of equivariantizations of fusion categories, *Journal of Mathematical Physics*, 54(2013), ID: 013511, (IF: 1.291).

See the 2012 report for a short abstract.

[2] A. L. Agore and G. Militaru – Unified products for Leibniz algebras, *Linear Algebra and its Applications*, 439 (2013), 2609-2633, (IF: 0,974)

This paper was written in the 2013 stage as part of the first objective, **Problem 1a**, of our grant proposal. The extending structures problem is formulated in the context of Leibniz algebras. We provide an answer to this problem by constructing two nonabelian coomological objects.

[3] A. L. Agore, G. Militaru – Classifying complements for Hopf algebras and Lie algebras, *Journal of Algebra*, 391(2013), 193-208 (IF: 0,613)

This paper was elaborated and published during the 2013 stage as part of the first objective, **Problems 1a), 1b)** and **1d)**, of our grant proposal. We formulate the classifying complements problem for an extension of Hopf/Lie algebras. The answer to this problem requires the introduction of a non-commutative descent type theory for bicrossed products.

[4] A. L. Agore, G. Militaru – Extending structures for Lie algebras, *Monatshefte für Mathematik*, 174(2014), 169-193, (IF: 0,616)

This paper was written in the 2013 stage as part of the first objective, **Problem 1a)**, of our grant proposal. The extending structures problem is formulated in the context of Lie algebras. As in the case of Leibniz algebras, we provide an answer to this problem by constructing two nonabelian coomological objects.

[5] A.L Agore – Coquasitriangular structures for extensions of Hopf algebras, *Glasgow Math. J.* 55 (2013), 1-15. (IF: 0.571)

See the 2012 report for a short abstract.

[6] A. L. Agore, C. G. Bontea, and G. Militaru – Classifying coalgebra split extensions of Hopf algebras, *J. Algebra Appl.* 12 (2013), 1-24. (IF: 0.483)

See the 2012 report for a short abstract.

[7] A.L. Agore, G. Militaru – Extending structures I: the level of groups, *Algebr. Represent. Theory*, 17(2014), 831-848, (IF: 0.595)

See the 2011 report for a short abstract.

[8] S. Burciu – Kernels of representations of Drinfel'd doubles of finite groups, *Cent. Eur. J. Math.*, 11(2013), 1900-1913 (IF: 0.440)

This paper is part of the second objective, **Problems 2d) and 2e)**, of our grant proposal. The main result provides a description for the commutator of a normal subcategory of the fusion category of representations of a semisimple Hopf algebra.

[9] C. G. Bontea – Classifying bicrossed products of two Sweedler's Hopf algebras, *Czechoslovak Math. J.*, 64(2014), 419-431 (IF: 0.262)

See the 2012 report for a short abstract.

Papers submitted for publication:

[T1] S. Burciu – On coideal subalgebras of cocentral Kac algebras and a generalization of Wall's conjecture.

[T2] S. Burciu – On the irreducible representations of generalized quantum doubles.

[T3] A. L. Agore, G. Militaru – Classifying complements for groups. Applications,

[T4] A. L. Agore, C. G. Bontea and G. Militaru – The classification of all crossed products $H_4 \# k[C_n]$.

[T5] A. L. Agore, G. Militaru – The extending structures problem for algebras.

[T6] V. Chari, B. Ion – BGG reciprocity for current algebras.

[T7] G. Militaru – The global extension problem, co-flag and metabelian Leibniz algebras.

[T8] A.L. Agore, G. Militaru – The global extension problem, crossed products and co-flag non-commutative Poisson algebras.

15.10.2013

Project director,

Prof. dr. Gigel Militaru