Graded rings and generalized crossed product algebras – a fruitful interplay and a frontier.

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Abstract

As early as 1970'th and 1980'th, there appeared a series of pioneering works by Freddy Van Oystaeyen, Michel Van den Bergh, Stefaan Caenepeel, Constantin Năstăsescu, Erna Nauwelaerts, Blas Torrecillas and Alain Verschoren on graded rings and (generalized) crossed product rings and algebras. Structures, methods and results from these fundamental contributions can be shown to play pivotal role for foundations of non-commutative geometry and representation theory, deformation theory and homological algebra as well as applications in other parts of mathematics and theoretical physics. This have stimulated growing interest and many contributions by other authors since 1980th. In the recent works by Freddy Van Oystaeyen, Erna Nauwelaerts and Tim Neijens on crystalline graded rings and generalized crossed products, a new exciting progress has been made in the study of graded rings and generalizations of crossed product constructions.

This talk will be devoted to:

1. a review of some of these works on graded rings and generalized crossed products;

2. new results and interesting problems on generalized crossed products, actions of semigroups and graded rings directly related to those works;

3. connections and applications of graded rings and generalized crossed products to generalizations and quantum deformations of graded Lie algebras, color Lie algebras and quasi Lie algebras.