

General Mathematics Seminar  
of the  
University of Luxembourg  
in cooperation with the  
Luxembourg Mathematical Society

**December, 2014**

**Tuesday, December 16, 2014 at 17.00**

**Campus Kirchberg, Room B02**

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**Macdonald polynomials and Highest weight categories**

Abstract: The goal of the talk is to explain an approach to the problem of categorification of Macdonald polynomials based on derived categories of modules over certain Lie algebras of currents. I recall the definition of Macdonald polynomials and explain its relationship with the K-theory of modules over certain Lie algebra of currents. From this point of view Macdonald polynomials are characters of certain exceptional collection in the corresponding derived category. Generalizing the setup one can get other different families of orthogonal polynomials related to representations of nonsemisimple Lie algebras. The corresponding theory becomes much simpler if one can prove the Highest weight property introduced originally for category  $\mathcal{O}$  by Beilinson-Bershtein-Gelfand. The example to be discussed is the current Lie algebra  $\mathfrak{g} \otimes \mathbb{C}[x]$ .