

The higher rank q -Bannai–Ito algebra and multivariate $(-q)$ -Racah polynomials**04.02****Hadewijch De Clercq***(Ghent University, Belgium)***Time:** Thursday 25.07., 11:00 - 11:30, Room HS 6

Abstract: The q -Racah polynomials are well-known to be bispectral, i.e. they can be defined through both a second-order q -difference equation and a three-term recursion relation. This bispectrality is described algebraically by the Askey–Wilson or Zhedanov algebra, and its counterpart under a transformation $q \rightarrow -q$, the so-called q -Bannai–Ito algebra. In this talk, I will explain how these connections can be generalized to multiple variables. We will construct a higher rank extension for the q -Bannai–Ito algebra by exploiting the Hopf algebraic structure of quantum groups. Then we will show how this novel algebra encodes the bispectrality of Gasper & Rahman’s multivariate $(-q)$ -Racah polynomials. More precisely, we will study how this algebra acts on the discrete series representation of the corresponding quantum group, and identify a class of canonical bases. Several such bases are in duality, in the sense that their overlap coefficients can be expressed as multivariate $(-q)$ -Racah polynomials. Iliev’s bispectral q -shift operators give rise to a discrete realization of the higher rank q -Bannai–Ito algebra. Finally, I will discuss the limit $q \rightarrow 1$, which suggests a construction for multivariate Bannai–Ito polynomials.

This is joint work with Hendrik De Bie.