FEDERICO PASINI, University of Western Ontario
Koszul property in Galois cohomology

Absolute Galois groups of fields are a main object of interest in algebraic number theory and related subjects, but we are very far from a satisfactory understanding of their structure. Yet, recently a great breakthrough has been obtained with the proof of Bloch-Kato conjecture. This gave mathematicians the first substantial insight on the rather mysterious Galois cohomology of an absolute Galois group (and of its pro-p quotients), an important invariant of a field. Its most significant consequence is that, in case a field contains a primitive p-th root of unity, the Galois cohomology of its absolute Galois group with coefficients in $\mathbb{F}_p$ is a quadratic algebra. There is a class of quadratic algebras with an uncommonly good homological behaviour and endowed with a useful duality functor: the class of Koszul algebras. L. Positselski conjectured that in the above situation the Galois cohomology of absolute Galois groups is always Koszul, and proved this for various classes of fields, e.g. for algebraic number fields.

We discuss the meaning of Koszulity in the framework of Galois theory and we show some new ways to prove Koszulity of Galois cohomology for other significant classes of fields.

This is a joint work with Jan Minac, Marina Palaisti, Claudio Quadrelli, Tan Nguyen Duy.