Public lecture

From simple algebras to the Block-Kato conjecture

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Abstract.

Hamilton's quaternion algebra over the real numbers was the first nontrivial example of a simple algebra discovered in 1843. I will review the history of the study of simple algebras over arbitrary fields that culminated in the proof of the Bloch-Kato Conjecture by the Fields Medalist Vladimir Voevodsky.

Time and Place

The lecture will take place on June 15, 2016, on St. John's campus of Memorial University of Newfoundland, in Room SN-2109 of Science Building. Beginning at 7 pm.

Awards and Distinctions of the Speaker

In 1986, Alexander Merkurjev was a plenary speaker at the International Congress of Mathematicians in Berkeley, California. His talk was entitled "Milnor K-theory and Galois cohomology". In 1994, he gave an invited plenary talk at the 2nd European Congress of Mathematics in Budapest, Hungary. In 1995, he won the Humboldt Prize, a prestigious international prize awarded to the renowned scholars. In 2012, he won the Cole Prize in Algebra, for his fundamental contributions to the theory of essential dimension.

Short overview of scientific achievements

The work of Merkurjev focuses on algebraic groups, quadratic forms, Galois cohomology, algebraic K-theory, and central simple algebras. In the early 1980s, he proved a fundamental result about the structure of central simple algebras of period 2, which relates the 2-torsion of the Brauer group with Milnor K-theory. In his subsequent work with Alexander Suslin, this result was extended to higher torsion as the Merkurjev-Suslin Theorem, recently generalized to the norm residue isomorphism theorem (previously known as the Bloch-Kato Conjecture), proven in full generality by Rost and Voevodsky (Fields Medal). In the late 1990s, Merkurjev created and developed the most general approach to the notion of essential dimension, introduced by Buhler and Reichstein, and made fundamental contributions to that field. In particular, he has determined the essential -dimension of central simple algebras of degree (for a prime) and, in a joint work with Karpenko, the essential dimension of all finite -groups.

Scientific profile:

Alexander Merkurjev has more than 88 publications cited in MathSciNet; several of them are in top 5 general mathematical journals: *Inventiones Mathematicae*, *Acta Mathematica*, and *Journal of American Mathematical Society*. He is a co-author of several very successful books that became standard references in the subject: "The algebraic and geometric theory of quadratic forms", "Cohomological invariants in Galois cohomology", "The book of involutions". Alexander Merkurjev has an outstanding influence on the field: according to MathSciNet database, he was cited 1704 times by 531 different authors.