WORKSHOP

MOTIVES, PERIODS AND L-FUNCTIONS

10.04.2017 – 12.04.2017

International laboratory for Mirror Symmetry and Automorphic Forms

Higher School of Economics, Usacheva 6, Moscow

Monday, April 10

16:00-17:00 Room 427	**Ludmil Katzarkov (HSE/ U. of Miami)** **Iterated Logs, Filtrations and new "Hodge" Structures** Based on ideas from Applied Mathematics we introduce new type of "Hodge" Structures. Applications will be discussed.
Coffee break 17:00-17:20	
17:20-18:20	**Vasily Golyshev (IITP / HSE)** **Quadratic Q-curves, units and L-values** We discuss in detail an instance of `Bloch-Kato by specialization' in mirror families.
18:30-19:30	**Sergey Gorchinsky (Steklov Inst / HSE)** **Integral Chow motives of threefolds with K-motives of unit type** It makes sense to compare different motives of a smooth projective algebraic variety. We discuss the following result: if a smooth projective variety of dimension less or equal to three has an integral K-motive of unit type, then its integral Chow motive is of Lefschetz type. The proof is based on a detailed analysis of torsion zero-cycles with the help of Merkurjev-Suslin theorem and various spectral sequences.
19:30-20:30	Discussion

Tuesday, April 11

17:40-18:00	
18:00-19:30 Room 427	**Spencer Bloch (U Chicago)** **Introduction to motivic Tamagawa numbers** An introduction to motivic Tamagawa numbers will be given. (joint session with the seminar "Automorphic forms and their applications")
19:30-20:30	Discussion

Wednesday, April 12

14:00-14:45 Room 306	**Pavel Sechin (HSE)** **Algebraic Morava K-theories: gamma filtration and Chern classes** 'In between' Grothendieck K-theory and Chow groups there exist orientable cohomology theories which are called algebraic Morava K-theories. We will explain some of their properties (e.g. existence of the gamma filtration and of Chern classes to some orientable theories) which make Morava K-theories appear similar to K-theory. We will also provide some applications to the study of Chow groups of quadrics over algebraically non-closed fields.
15:00-15:45	**Nina Sakharova (HSE)** **Bimodular forms with given residues** Let Y_0(1) be a modular curve and T_N be a curve which is the graph of the N-th modular Hecke correspondence embedded in Y_0 (1) x Y_0 (1). For a finite subset S of natural numbers consider the divisor D_S which is the union of the modular correspondences. A non compact surface that is the complement to this divisor is denoted by Y_S. It is well known that in case of the divisor with normal crossings, the cohomology of the complement of the divisor on a nonsingular complex manifold is expressed in terms of the cohomology of the complex of differential forms with logarithmic poles along the divisor. I'll talk about the construction of such differential forms with given residues on the non compact surface Y(1, N).
16:00-16:45	**Dimitry Tyurin (HSE)** **Relative Milnor K-groups of split nilpotent extensions** Consider the split nilpotent extension R=S+J of a commutative ring S, containing 1/2 and with sufficiently many invertible elements (the degree of nilpotency is 2). We will prove, that the relative Milnor K-group K_2^M(R,J) is isomorphic to the quotient Omega^1_{R,J}/dJ of relative Kaehler differentials by it's Z-submodule dJ. This can be deduced in a slightly different form from previous results of Van der Kallen and S. Bloch, but in our case the proof will not require any machinery of algebraic K-theory and will be given in terms of symbols only.
Coffee break 16:45-17:15	
17:15-18:00 Room 427	**Alexander Kalmynin (HSE)** **Intervals between numbers that are sums of two squares and Jacobi-type forms** Let S be the set of all numbers that can be expressed as the sum of two squares and R(x) be the distance from positive real number x to the set S. Classical conjecture due to Euler states that R(x)=x^o(1). In my talk, I will show that Cohen-Kuznetzov construction of Jacobi-type forms can be used to establish new bounds for moments of R(x).
18:00-18:45	**Alexander Petrov (HSE)** **Non-commutative crystalline cohomology** Let X be a scheme over F_p. The algebraic de Rham cohomology has the following striking property: for any two liftings X_1, X_2 of X over Z/p^nZ their de Rham cohomology H_dR(X_1/Z/p^n) and H_dR(X_2/Z/p^n) are canonically isomorphic. This leads to the definition of crystalline cohomology -- a cohomology theory which assigns to any scheme X a Z/p^n-module which is canonically isomorphic to the de Rham cohomology of any lifting(if it exists) and gives a completely new object if there are no lifting. I will discuss a non-commutative analog of this construction. Namely, considering periodic cyclic homology of a DG algebra as a non-commutative analog of the de Rham cohomology, non-commutative crystalline cohomology will be a functor which assigns to a DG algebra A over F_p a Z/p^n module which is canonically isomorphic to the periodic cyclic homology of any lifting of A over Z/p^n. This is a joint work with Vadim Vologodsky.

18:45-19:45	Discussions