Poster Session Abstracts

- **Jake Huryn: On ℓ-independence of monodromy groups after restriction to a point.**

  Fix a connected normal scheme X of finite type over $\mathbf{Z}$. Let G be a reductive group over $\mathbf{Q}$ and $\{\rho_\ell \colon \pi_1(X[1/\ell]) \to G(\mathbf{Q}_\ell)\}_\ell$ a Frobenius-compatible collection of continuous homomorphisms indexed by a set of primes of Dirichlet density 1. If the ρ_ℓ are of motivic origin, Tate's conjecture predicts that any $x \in X_{\mathbf{Q}}$ has the following property "(M)": the restrictions $\rho_\ell|_{\pi_1(\{x\})}$ have algebraic monodromy groups independent of ℓ in the sense that for some reductive group H over $\mathbf{Q}$, the Zariski closure of $\mathrm{Img}(\rho_\ell|_{\pi_1(\{x\})})$ is isomorphic to $H_{\mathbf{Q}_\ell}$ for all ℓ.

  Consider the question: If the generic point of X satisfies (M), does there exist, unconditionally, a *single* closed point of $X_{\mathbf{Q}}$ satisfying (M)? We provide a partial answer. Assume $\mathrm{Img}(\rho_\ell)$ is Zariski-dense in $G_{\mathbf{Q}_\ell}$ for all ℓ. Then, under some strict assumptions on G (but no further hypotheses on X or the ρ_ℓ), we find infinitely many closed points x of $X_{\mathbf{Q}}$ such that the Zariski closure of $\mathrm{Img}(\rho_\ell|_{\pi_1(\{x\})})$ is $G_{\mathbf{Q}_\ell}$ for all ℓ in a set of Dirichlet density 1. In particular, x "satisfies (M) along a large set of primes".
- **Alexandros Kafkas: Residues of logarithmic connections and equivariant Riemann-Roch corrections terms.** Given a smooth surface X with a group action, we have the notion of a G-equivariant line bundle on X. The virtual Euler characteristic of the equivariant line bundle is the virtual representation of the alternating sum of the representations of the cohomology groups. We will give an approach to calculating equivariant Riemann-Roch correction terms using logarithmic connections and residue formulas.
- **Hyunsuk Kim: The intersection cohomology Hodge module of toric varieties.** We study the Hodge filtration of the intersection cohomology Hodge module for toric varieties. More precisely, we study the cohomology sheaves of the graded de Rham complex of the intersection cohomology Hodge module and give a precise formula relating it with the stalks of the intersection cohomology as a constructible complex. The main idea is to use the Ishida complex in order to compute the higher direct images of the sheaf of reflexive differentials.

  This is a preprint with Sridhar Venkatesh, in https://arxiv.org/abs/2404.04767
- **Riku Kurama: Fourier-Mukai Equivalence of Abelian Varieties and K3 Surfaces in Positive and Mixed Characteristics** In this poster session, we report on the ongoing work which studies Fourier-Mukai transforms between (families of) abelian varieties and K3 surfaces in positive and mixed characteristics. One particular focus is the canonical lifts of ordinary abelian varieties and K3 surfaces over the ring of Witt vectors. For instance, we have shown that Fourier-Mukai equivalences between ordinary K3 surfaces or abelian varieties lift to their canonical lifts, thereby yielding a description of the Fourier-Mukai partners of such canonical lifts. Related to this, we also plan to report on a characteristic-free proof that Fourier-Mukai partners of abelian varieties are abelian varieties.
- **Peikai Qi:Iwasawa λ invariant and Massey products** How does the class group of the number field change in field extensions? This question is too wild to have a uniform answer, but there are some situations where partial answers are known. I will compare two such situations. First, in Iwasawa theory, instead of considering a single field extension, one considers a tower of fields and estimates the size of the class groups in the tower in terms of some invariants called λ and μ. Second, in a paper by Lam-Liu-Sharifi-Wake-Wang, they relate the relative size of Iwasawa modules to values of a "generalized Bockstein map", and further relate these values to Massey products in Galois cohomology in some situations. I will compare these two approaches to give a description of the cyclotomic Iwasawa λ-invariant of some imaginary quadratic fields and cyclotomic fields in terms of Massey products.
- **Gleb Terentiuk: Non-abelian Hodge theory in positive characteristic via prismatization.** Given a smooth scheme X over a field k of positive characteristic with a flat lift to $W_2(k)$, Ogus and Vologodsky produce an equivalence of suitable categories of D-modules and Higgs modules. It turns out this equivalence can be seen using the theory of prismatization developed by Drinfeld and Bhatt-Lurie and the goal of my poster is to explain this approach which is a joint work with Bogdan Zavyalov.
- **Yilong Zhang: Algebraic cycle on Prym varieties through class field theory**

Abstract: Geometric Class field theory implies that any abelian Galois cover of smooth projective curves factors through an abelian cover of abelian varieties. In this talk, I will show how it applies to Hodge theory and produces algebraic cycles for certain abelian varieties with CM structure. Such abelian varieties are Prym varieties associated with an abelian stale cover of a curve. This result generalizes Schoen's work for the cyclic cover case in 1988. This is a joint work with Deepam Patel.