

Topology Seminar

Alexander Petrov

of MIT will be speaking on

Torsion in p -adic cohomology via power operations

on October 21 at 4:30 in
MIT Room 2-131

Cohomology of a smooth projective variety over the complex numbers admits a Hodge decomposition, and the de Rham algebra of smooth differential forms on it is canonically formal, as a commutative differential graded algebra. For a variety over a field k of characteristic p the analogous statements are no longer true. The de Rham cohomology algebra is in general not formal as an \mathbb{E}_∞ algebra over k as can be seen by considering the Frobenius action on de Rham cohomology. I will discuss a recipe for constructing examples of situations where (logarithmic) de Rham cohomology fails to have a Hodge decomposition, based on the discrepancy between the \mathbb{E}_∞ algebra structures on de Rham and Hodge cohomology. Analogous construction also produces examples of smooth schemes over \mathbb{Z}_p whose (logarithmic) prismatic cohomology has non-zero u -torsion.