Department of Mathematics, BGU

# AGNT

**On** *Wednesday, November ,13 2024*

**At** *14:10 – 15:10*

**In** *101-*

Mikhail Borovoi (TAU)

will talk about

## The power operation in the Galois cohomology of a reductive group over a number field

Abstract: For a number field K admitting a real embedding, it is impossible to construct a functorial in G group structure in the Galois cohomology pointed set H^1(K,G) for all connected reductive K-groups G. However, over an arbitrary number field K, we define a *diamond* (or *power*( operation of raising to power n (x,n) \mapsto x^{\Diamond n}: H^1(K,G) \times Z <- H^1(K,G). We show that this operation has many functorial properties. When G is a torus, the set H^1(K,G) has a natural group structure, and x^{\Diamond n} coincides with the n-th power of x in this group.

For a cohomology class x in H^1(K,G), we define the period per(x) to be the greatest common divisor of n>0 such that x^{\Diamond n}=1, and the index ind(x) to be the greatest common divisor of the degrees [L:K] of finite separable extensions L/K splitting x. These period and index generalize the period and index of a central simple algebra over K (in the special case where G is the projective linear

group $PGL_n$, the elements of $H^1(K, G)$ can be represented by central simple algebras). For an arbitrary reductive group G defined over a local or global field K, we show that per(x) divides ind(x), that per(x) and ind(x) have the same prime factors, but the equality per(x)=ind(x) may not hold.

The talk is based on a joint work with Zinovy Reichstein.