1056-20-139   **Ming-Hsuan Kang*** (`kang_m@math.psu.edu`), 2302 Plaza Drive, State College, PA 16801. *Zeta Functions of Complexes Arising from PGL_n*.

In this talk, we define zeta functions on finite quotients of the Affine Bruhat-Tits building B_n of G=PGL(n) over a p-adic local field and discuss their properties.

Fix a finite quotient X_Γ of B_n by a discrete cocompact torsion-free subgroup Γ. X is an $(n-1)$-dimensional CW complex and its simplices are parametrized by cosets of parahoric subgroups. We attach each standard parahoric subgroup P a local zeta function, which counts the number of closed geodesic passing through the cosets of P. These local zeta functions are rational functions and have closed forms in terms of parahoric Hecke operators.

The main result is to show the twisted alternating product of these zeta functions satisfy an identity involving the Euler characteristic of X_Γ. The proof is based on the decomposition of $L^2(\Gamma \backslash G)$ and the classification of irreducible admissible representations of PGL(n).

Moreover, we can use this twisted alternating product to test the triviality of continuous cohomology of a G-module.

Finally, we conjecture some equivalent conditions on Ramanujan property of X_Γ via the absolute values of roots of these zeta functions. (Received July 31, 2009)