1036-22-155 **Birgit Speh***, Birgit Speh, Ithaca, NY 14850. *Lefschetz numbers of automorphism on the cuspidal cohomology.* Preliminary report.

This is a preliminary report of joint work with Dan Barbasch. Let G be a reductive simply connected linear algebraic group defined over $\mathbf{Q}$ and let τ and automorphism of G of finite order also defined over $\mathbf{Q}$. The adels of $\mathbf{Q}$ are denoted by $\mathbf{A} = \prod_\nu \mathbf{Q}_\nu = \mathbf{R}\mathbf{A}_f$. The automorphism τ acts also on the automorphic functions $A_{cusp}(G(\mathbf{A}))$ on $G(\mathbf{A})$; it leaves the space $A_{cusp}(G(\mathbf{A}))$ of cusp forms invariant. Invariance properties of automorphic cuspidal representations under automorphisms are often reflected in the properties of their L–functions.

Let K_∞ be the maximal compact subgroup of $G(\mathbf{R})$, $K(A_f)$ a compact open subgroup of $G(A_f)$ stable under τ and F a finite dimensional irreducible representation of $G(\mathbf{R})$. I will discuss criteria for the nonvanishing of the Lefschetz number $L(\tau)$ of τ on the cuspidal cohomology

$$H^*_{cusp}(G(\mathbf{A})/K_\infty K(A_f), \tilde{F}) = H^*(\mathbf{g}, K, A_{cusp}(G(\mathbf{A})) \otimes F).$$

The main tool is the Arthur Selberg trace formula. (Received January 21, 2008)