1021-11-211 **Djordje Milicevic*** (djordje@umich.edu), University of Michigan, Department of Mathematics, East Hall – 530 Church Street, Ann Arbor, MI 48109. *Large values of eigenfunctions on arithmetic hyperbolic manifolds.*

Extremal behavior of high-energy eigenfunctions on Riemannian manifolds is not well understood and depends heavily on their global geometry. For hyperbolic manifolds, this problem is part of understanding the so-called quantum chaos. In this talk, we present recent omega results for L^∞-norms of Hecke-Maass eigenforms on certain arithmetic manifolds.

In case of arithmetic surfaces, our estimate

$$\|\phi_\lambda\|_\infty = \Omega\left(\exp((1+o(1))\sqrt{\log\lambda/\log\log\lambda})\right)$$

in particular shows that eigenfunctions on these surfaces do not obey the Random Wave Conjecture, which predicted much more moderate growth. We construct two spectral averages involving twists of the pre-trace formula by various Hecke operators and weigh them by a parameter sequence. The weights are chosen to maximize the quotient of certain two quadratic forms as in Soundararajan's recent method of resonators.

On certain arithmetic 3-manifolds, we prove by this method

$$\|\phi_\lambda\|_\infty = \Omega\left(\lambda^{1/4+o(1)}\right),$$

consistent with the rate of growth obtained in particular cases by functorial methods. The class of manifolds exhibiting power growth is distinguished by a remarkable geometric property. We also discuss possible general statements. (Received September 06, 2006)