1047-53-294 **Peter B Shalen*** (shalen@math.uic.edu), Dept. of Math., Stat. and CS (M/C 249), University of Illinois at Chicago, 851 S. Morgan St., Chicago, IL, IL 60657. *Margulis numbers and trace fields.*

I will describe interactions between the quantitative geometry of a closed, orientable hyperbolic 3-manifold M and its trace field K. Here are some consequences of the general method:

(A) Assume that (1) M is non-Haken and (2) $H_1(M; Z_p)$ is trivial for $p = 2$, 3 and 7. If the trace field of M is quadratic then 0.395 is a Margulis number for M. If the trace field is cubic then 0.3 is a Margulis number for M.

(B) If K is any number field, then for all but finitely many closed, orientable hyperbolic 3-manifolds M which satisfy (1) and (2) and have trace field K, the number 0.183 is a Margulis number for M.

(C) If K is any number field, there is a real number ϵ with $0 < \epsilon \leq 0.3$, having the following property. Let M be any closed hyperbolic 3-manifold which satisfies (1) and (2) and has trace field K. Then about every primitive closed geodesic in M having length $l < \epsilon$ there is an embedded tube having radius $R(l)$, where $R(l)$ is an explicitly defined function such that $\sinh^2 R(l)$ is asymptotic to $(.01869...)/l$. (Received January 31, 2009)