Summary of research results to date
(Numbers correspond to the attached paper list)

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1 Epstein-Penner decompositions

Epstein-Penner decomposition is an ideal polyhedral decomposition for a cusped hyperbolic 3-manifold. I have studied about the property of Epstein-Penner decomposition for cusped hyperbolic 3-manifolds which contain incompressible thrice punctured spheres ([6], [8]).

By subdividing Epstein-Peneer decomposition, we proved partial result about convex ideal triangulation of cusped hyperbolic 3-manifold ([10], [11]).

2 Determination of commensurability

If two hyperbolic 3-manifolds or orbifolds M_1, M_2 have homeomorphic finite-sheeted covering spaces, we say M_1 and M_2 are **commensurable**. "commensurability" is an equivalence relation.

We costructed an arbitrary number of hyperbolic 3-manifolds which can not be distinguished commensurability by cusp parameter, and the ratio of cusp volume and that of manifold but are mutually incommensurable ([5], [9]). In [4], we show the incommensurability for three cubic Coxeter groups by calculating the commensurators of them.

In [13], for cusped hyperbolic 3-manifolds or orbifolds M_1, M_2, we show that if $0 < \mathrm{vol}(M_1) - \mathrm{vol}(M_2) < 0.252725\cdots$, M_1 and M_2 are incommensurable. By using this result, it can be seen that the set of manifolds which are obtained by Dehn filling of a cupsd manifold M, contains infinitely many commensurablity classes.

We also showed that closed hyperbolic 3-manifolds V2050(4,1) and V3404(1,3) are incommensurable by using the ratio of volumes.

3 Volume

In [7], we estimate the volume of 2-cusped hyperbolic manifold. In [1], we show that ideal regular cube has the second smallest volume and pentagonal prism has the third smallest volume among $\pi/3$-equiangular polyhedra.