

# Fundamental polyhedra for Margulis space time

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November 19, 2019

## 1 ABSTRACT

In this seminar we will study complete affinely flat manifolds  $\mathbf{M}$  which is a quotient  $\mathbf{M} = \mathbb{R}^n / \Gamma$  where  $\Gamma \subset \text{Aff}(\mathbb{R}^n)$  acts properly discontinuously on  $\mathbb{R}^n$ , and  $\pi_1(\mathbf{M}) \simeq \Gamma$ . Bieberbach's theorem shown that :  $\pi_1(\mathbf{M})$  is torsion free, finitely generated, virtually abelian and can be compact. In 1977 Milnor showed that If  $\mathbf{G}$  is virtually polycyclic then there is some complete affinely flat manifold  $\mathbf{M}$  such that  $\pi_1(\mathbf{M}) \simeq \mathbf{G}$ , and he asked if the converse was true. In 1983 Margulis showed that there exist free subgroup  $\Gamma \subset \text{Aff}(\mathbb{R}^3)$  acting properly discontinuously on  $\mathbb{R}^3$ , thus answering Milnor question negatively, so the corresponding manifolds will be call Margulis space time. We end by constructing noncompact fundamedntal polyhedra for the action of  $\Gamma$  acting on  $\mathbb{R}^3$  equivalent to the geometric conditions given by Drumm.

## 2 REFERENCES

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