

# FIM

# Nachdiplomvorlesung

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## Geometric and topological aspects of Coxeter groups and buildings

2 March to 1 June 2016

Wednesdays, 10.15 - 12.00 h

HG G 43, ETH Zürich, Rämistrasse 101

### Abstract

We will begin by reviewing the basic theory of Coxeter and reflection groups. We will then study the Davis complex, a cell complex with „good“ geometric and topological properties on which the associated Coxeter group acts „nicely“. We will prove Moussong’s Theorem, which characterises the Coxeter groups which are hyperbolic in the sense of Gromov, and discuss the use of the Davis complex to determine cohomology of Coxeter groups.

In the second part of the course we will study buildings. Using the theory of Coxeter groups and the Davis complex already discussed, we will establish the equivalence of the main definitions of a building, and describe the main geometric realisations of a building. We then discuss the use of buildings to study groups which act on them, including algebraic groups over local fields, arithmetic groups, and other lattices. If time permits we will consider the theory of twin buildings, which appears in the study of Kac-Moody groups.

[www.fim.math.ethz.ch/lectures](http://www.fim.math.ethz.ch/lectures)