SMALL CANCELLATION THEORY course

**SPEAKER:** Dominik Gruber (ETH)

**DATE:** 28 - 31 January 2019* - 11:30

**VENUE:** Aula 420, Módulo 17, Departamento de Matemáticas, UAM

**ORGANISER:** ICMAT-UAM

**ABSTRACT:** Small cancellation theory studies groups that are given by presentations in which the defining relations have small common subwords. By translating group theoretic questions into geometry and applying concepts of negative curvature, the theory produces a variety of theorems on infinite groups. One of its particular strengths is the construction of infinite groups with exceptional algebraic, geometric, and analytic properties, so-called infinite monster groups. We will give an introduction to the methods and results of classical small cancellation theory. We will see how the Euler characteristic formula for planar graphs enables constructions of infinite groups with prescribed properties, such as examples of finitely generated infinite simple groups. Furthermore, we will solve the word problem in small cancellation groups. We will then discuss Gromov’s graphical small cancellation theory. We will show how the methods from classical small cancellation theory generalize to this setting, and how graphical small cancellation theory produces groups with prescribed embedded subgraphs in their Cayley graphs. As notable application, we will discuss Gromov’s monsters - groups containing expanders in their Cayley graphs. Finally, we will explore connections of small cancellation theory to the geometric notion of Gromov hyperbolicity. These connections, on the one hand, yield strong structural results on small cancellation groups and, on the other hand, enable constructions of further exceptional groups, such as examples of finitely generated infinite periodic groups.

*If necessary, there will be held a new lecture on Friday, 1 February.