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TOPOLOGY PROCEEDINGS

Volume 48, 2016

Pages 277–287

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Electronically published on December 3, 2015

Topology Proceedings

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E-mail:	topolog@auburn.edu
ISSN:	0146-4124

http://topology.auburn.edu/tp/
http://topology.nipissingu.ca/tp/

TOPOLOGY PROCEEDINGS
Volume 48 (2016)
Pages 277-287

E-Published on December 3, 2015

CAT(0) EXTENSIONS OF RIGHT-ANGLED COXETER GROUPS

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Abstract. We show that any split extension of a right-angled Coxeter group W_Γ by a generating automorphism of finite order acts faithfully and geometrically on a CAT(0) metric space.

1. Introduction

An isometric group action is *faithful* if its kernel is trivial, and it is *geometric* if it is cocompact and properly discontinuous. A finitely generated group G is a *CAT(0) group* if there exists a CAT(0) metric space X equipped with a faithful geometric G-action. The CAT(0) property is not an invariant of the quasi-isometry class of a group (see, for example, [1], [6], and [3, p. 258]). Whether or not it is an invariant of the abstract commensurability class of a group is as yet unknown. Attention was brought to this matter in [8]. In this article we illustrate that answering this question for any family of CAT(0) groups may require a variety of techniques.

It is well known that an arbitrary right-angled Coxeter group W is a CAT(0) group because it acts faithfully and geometrically on a CAT(0) cube complex X. It is also well known that the automorphism group $\mathrm{Aut}(W)$ is generated by three types of finite-order automorphisms. As a natural source of examples we consider split extensions of right-angled Coxeter groups by finite cyclic groups, where, in each case, the cyclic

2010 *Mathematics Subject Classification.* Primary 20F65, 20F55.

Key words and phrases. automorphisms, CAT(0) extensions, CAT(0) groups, Coxeter groups.

This work was partially supported by a grant from the Simons Foundation (#317466 to Adam Piggott).