DATE: March 15, 2021

TO: Faculty and Students

FROM: Professor(s) Julien Paupert
Chair/Co-Chairs of David Michael Polletta
Defense for the PhD in Mathematics
Committee Members Brett Kotschwar
Mathias Kawski
Nancy Childress
Susanna Fishel

DEFENSE ANNOUNCEMENT

Candidate: David Michael Polletta
Defense Date: 04/16/2021
Defense Time: 1:00 PM
Virtual Meeting Link: https://asu.zoom.us/j/86720901676
Title: The geometry of 1-cusped and 2-cusped Picard modular groups

Please share this information with colleagues and other students, especially those studying in similar fields. Faculty and students are encouraged to attend. The defending candidate will give a 40 minute talk, after which the committee members will ask questions. There may be time for questions from those in attendance. But, guests are primarily invited to attend as observers and will be excused when the committee begins its deliberations or if the committee wishes to question the candidate privately.

ABSTRACT
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Abstract

Mark and Paupert concocted a general method for producing presentations for arithmetic non-cocompact lattices, $\Gamma$, in isometry groups of negatively curved symmetric spaces. To get around the difficulty of constructing fundamental domains in spaces of variable curvature, their method invokes a classical theorem of Macbeath applied to a $\Gamma$-invariant covering by horoballs of the negatively curved symmetric space upon which $\Gamma$ acts. In this thesis, we will discuss the application of their method to the Picard modular groups, $\text{PU}(2, 1; \mathcal{O}_d)$, acting on $\mathbb{H}^2$. We will show the derivations for the group presentations corresponding to $d = 2, 11$, which completes the list of presentations for Picard modular groups whose entries lie in Euclidean domains, namely those with $d = 1, 2, 3, 7, 11$. We will also explore the differences in the method’s application when our lattice of interest has multiple cusps by examining the smallest value of $d$ where the corresponding Picard modular group has multiple cusps, $\text{PU}(2, 1; \mathcal{O}_5)$. 