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Rachel M. Davis* (rdavis@math.wisc.edu). *On the Images of Outer Galois Representations Associated to Elliptic Curves*. Preliminary report.

For ℓ -adic representations of the absolute Galois group associated to elliptic curves, much is understood about the sizes of the images and about the conjugacy invariants of the images of Frobenius elements. On the other hand, much less is known about the outer Galois representations associated to elliptic curves. These are representations from the absolute Galois group to an outer automorphism group of a free pro- ℓ group.

The goal of this research is to take a first step in understanding more concretely Galois representations to automorphism groups of non-abelian groups. Let E be a semistable elliptic curve over \mathbb{Q} with good supersingular reduction at 2. Associated to E , there is a Galois representation to a certain subgroup of the automorphism group of a metabelian group. I show that there is a Galois representation surjecting to this subgroup (with the right ramification). Then, I compute some conjugacy invariants for the images of the Frobenius elements. This will give rise to new arithmetic information analogous to traces of Frobenius for the ℓ -adic representation. (Received September 10, 2012)