

# Mapping class group representations via Heisenberg homology

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## Abstract.

One of the earliest interesting representations of the braid groups is the *Burau representation*. It is the  $n = 1$  case of the family of *Lawrence representations*, defined topologically by thinking of the braid group as the mapping class group of the punctured disc, which acts naturally on the homology of certain infinite coverings of the  $n$ -point configuration space on the punctured disc. Famously, the Burau representation is almost never faithful, but the  $n = 2$  Lawrence representation is always faithful.

I will describe an analogue of the Lawrence representations for mapping class groups of compact orientable surfaces  $\Sigma$ , associated to any given representation  $V$  of the discrete Heisenberg group  $\mathcal{H} = \mathcal{H}(\Sigma)$ . These are twisted representations of the mapping class group  $\mathfrak{M}(\Sigma)$ , but they may be untwisted on the Torelli group by passing to a  $\mathbb{Z}$ -central extension. Moreover, when  $V$  is the Schrödinger representation of  $\mathcal{H}$ , they may be untwisted on the full mapping class group  $\mathfrak{M}(\Sigma)$  by passing to a double covering.

This represents joint work with Christian Blanchet and Awais Shaukat.