

Mapping class group representations via Heisenberg and Schrödinger

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Abstract.

One of the oldest interesting representations of the braid groups is the *Burau representation*. It is the first of the family of *Lawrence representations*, defined topologically via the action of the braid group on the homology of certain infinite coverings of configuration spaces on the punctured disc. Famously, the Burau representation is almost never faithful, but the $k = 2$ Lawrence representation is always faithful.

I will describe analogues of the Lawrence representations for (subgroups of) the mapping class group of the surface $\Sigma = \Sigma_{g,1}$. First, associated to any representation V of the *discrete Heisenberg group* $\mathcal{H} = \mathcal{H}(\Sigma)$, we obtain a family of representations (indexed by $k \geq 2$) of the Torelli group of Σ . Second, in the special case where V is the *Schrödinger representation* of \mathcal{H} , we obtain a family of representations of the universal central extension of the full mapping class group of Σ . Along the way I will also discuss representations of action groupoids, and the *Morita subgroup* of the mapping class group.

This represents joint work with Christian Blanchet and Awais Shaukat. See [arxiv:2109.00515](https://arxiv.org/abs/2109.00515).