Title

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Remark 1.
There is a natural action of $\mathrm{MCG}(\Sigma)$ on $H_1(\Sigma;\mathbb{Z})$, i.e. a *homology representation* of $\mathrm{MCG}(\Sigma)$:

$$\rho : \mathrm{MCG}(\Sigma) \to \mathrm{Aut}_{\mathrm{Grp}}(H_1(\Sigma;\mathbb{Z}))$$
$$f \mapsto f_*.$$

Theorem 1.1 ***(Mapping Class Group of the Torus).***
The homology representation of the torus induces an isomorphism

$$\sigma : \mathrm{MCG}(\Sigma_2) \xrightarrow{\cong} \mathrm{SL}(2,\mathbb{Z})$$