Homological action of the modular group on some cubic moduli spaces.

We describe the action of the automorphism group of the complex cubics of the form $x^2 + y^2 + z^2 - xyz - Px - Qy - Rz$ on the homology of their fibers. These actions include the action of the mapping class group of a punctured torus on the subvarieties of its $\text{SL}(2, \mathbb{C})$ character variety given by fixing the trace of the peripheral element (so-called “relative character varieties”) and the actions of the mapping class group of a four-holed sphere on its relative character varieties. The mapping class groups in these two cases are isomorphic to $\text{PGL}(2, \mathbb{Z})$ and its $2$-congruence subgroup respectively. (Received September 21, 2004)