Meeting: 1003, Atlanta, Georgia, SS 10A, AMS Special Session on Dynamics of Mapping Class Groups on Moduli Spaces, I

1003-53-1018 **George Stantchev*** (gogo@math.umd.edu), Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742-2431, and **William Goldman** (wmg@math.umd.edu), Department of Mathematics, University of Maryland, College Park, MD 20742. *Dynamics of the Automorphism Group of the $GL(2,\mathbb{R})$-Characters of a Rank Two Free Group.*

Let π be a free group of rank 2. Its outer automorphism group $\mathrm{Out}(\pi)$ acts on the space of equivalence classes of representations $\rho \in \mathrm{Hom}(\pi, \mathrm{SL}(2,\mathbb{C}))$. Let

$$\mathrm{SL}_-(2,\mathbb{R}) = \{A \in \mathrm{GL}(2,\mathbb{R}) \mid \det(A) = -1\}$$

and let

$$\mathrm{ISL}(2,\mathbb{R}) = \mathrm{SL}(2,\mathbb{R}) \amalg i\mathrm{SL}_-(2,\mathbb{R})$$

Three of the four connected components of $\mathrm{Hom}(\pi, \mathrm{ISL}(2,\mathbb{R}))$ consist of representations that send at least one generator of π to $i\mathrm{SL}_-(2,\mathbb{R})$. We investigate the dynamics of the $\mathrm{Out}(\pi)$-action on these components.
The group $\mathrm{Out}(\pi)$ is commensurable with the group Γ of automorphisms of $\mathbb{C}^3$ fixing the polynomial

$$\kappa(x,y,z) = -x^2 - y^2 + z^2 + xyz - 2$$

We show that for $-14 < c < 2$, the action of Γ is ergodic on $\kappa^{-1}(c)$. For $c < -14$, the group Γ acts properly and freely on an open subset $\Omega_c^M \subset \kappa^{-1}(c)$ and acts ergodically on its complement. For $c < -14$, the set Ω_c^M identifies with a subset of the Fricke space of the one-holed Möbius band. We construct an algorithm which determines, in polynomial time, if a point on $\kappa^{-1}(c)$ is Γ-equivalent to a point in Ω_c^M or in its complement. (Received October 02, 2004)