Given an algebraically closed field $K$, the group $\text{PGL}_2(K)$ acts on the set of all rational maps $\phi : \mathbb{P}^1(K) \to \mathbb{P}^1(K)$ by conjugation. Given a map $\phi$, we can compute its automorphism group $\text{Aut}(\phi)$, which is the stabilizer of $\phi$ in $\text{PGL}_2(K)$ under this group action. It is known that $\text{Aut}(\phi)$ is a finite group. Restricting our attention to fields of positive characteristic, we use the classification of finite subgroups of $\text{PGL}_2(K)$ to show that every finite subgroup is isomorphic to $\text{Aut}(\phi)$ for some $\phi$.

The action of conjugation creates a natural equivalence relation on $\text{Rat}_d$, the space of degree-$d$ rational maps. We can then consider the quotient space $\mathcal{M}_d(K)$. Under this relation, equivalent maps have isomorphic automorphism groups, so the set of all maps with a non-trivial automorphism group is well defined in $\mathcal{M}_d(K)$. We call this the automorphism locus. The automorphism locus of $\mathcal{M}_2$ has been studied over fields of characteristic 0; we describe the automorphism locus of $\mathcal{M}_2(\overline{\mathbb{F}}_p)$, for all primes $p$, by following techniques from the proof of the former. When $p = 2$, it turns out that the automorphism locus is not Zariski-closed. (Received September 17, 2019)