

Non-homeomorphic Galois conjugate surfaces

David Torres Teigell

Universidad Autónoma de Madrid

The dimensions of the cohomology groups $H^i(X, \mathbb{C})$ of a complex projective variety X are invariant under Galois action. In particular the most common topological invariants (Betti numbers and signature) are preserved under the action of the Galois group, and this fact is enough in dimension one to ensure that the curves X and X^σ are always homeomorphic. However, in 1964 J. P. Serre constructed an example of two Galois conjugate varieties which are non-homeomorphic.

In the year 2000 Catanese introduced a class of rigid surfaces (Beauville surfaces) defined over the field of algebraic numbers $\overline{\mathbb{Q}}$ that should provide a fertile source of examples of this phenomenon. They are constructed as the quotient of a product $S_1 \times S_2$ of two quasiplatonic curves by the free action of a finite group G .

In this talk we will construct families of Beauville surfaces which, forming a complete orbit under the action of the absolute Galois group $\text{Gal}(\overline{\mathbb{Q}}/\mathbb{Q})$, are pairwise non-homeomorphic.

(joint work with Gabino González-Diez)