

Mazur's Question on mod 11 Representations of Elliptic Curves

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Abstract:

In 1978 Mazur asked whether there are any pairs (E_1, E_2) of non-isogenous elliptic curves over \mathbb{Q} whose associated mod N Galois representations are symplectically isomorphic, for some $N \geq 7$. In this paper we show that there exist in fact infinitely many one-parameter families of such pairs.

This result is obtained by studying the geometry and arithmetic of the modular diagonal quotient surface $Z_{11,1}$ introduced in [9].