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Rational torsion on abelian surfaces with quaternionic multiplication

Mazur classified all possible rational torsion subgroups of elliptic curves over $\mathbb{Q}$. In joint work with Ciaran Schembri, Ari Shnidman and John Voight, we put strong constraints on the torsion subgroup of a class of abelian surfaces whose geometric endomorphism algebra is large, namely an indefinite quaternion algebra. The proof uses quaternion arithmetic, Neron models, and the modularity of abelian surfaces of GL_2-type.