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On the Manin-Mumford conjecture for abelian varieties with a prime of supersingular reduction. (English) [Zbl 1100.14036](#)

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The Manin-Mumford conjecture asserts that an irreducible closed subvariety X of abelian variety A defined over a number field such that the torsion subgroup of A intersects X in a Zariski dense subset of X is necessarily a translate of an abelian subvariety of A . This conjecture has been proved by Raynaud and many proofs are now available. The present paper gives a very short proof for the special case that A has supersingular reduction at a prime dividing p and the prime-to- p part of the torsion subgroup of A has Zariski-dense intersection with X . It combines methods of Bogomolov, Hrushovski and Pink and Roessler. The idea is that at the supersingular reduction a power of Frobenius acts as a power q^m of the cardinality q of the residue field on the prime-to- p part of the torsion, hence using the fact that the prime-to- p torsion of A is isomorphic to that of the supersingular fibre one concludes that a lift of Frobenius acts on the prime-to- p part of the torsion of A as q^m , hence X is stable under multiplication by q^m . This implies that X is a translate of an abelian subvariety. The paper also discusses the relation with the other proofs.

Reviewer: Gerard van der Geer (Amsterdam)

MSC:

- [14K12](#) Subvarieties of abelian varieties
- [11G10](#) Abelian varieties of dimension > 1
- [14G15](#) Finite ground fields in algebraic geometry

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