Good reduction of Fano threefolds and sextic surfaces

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Abstract. We investigate versions of the Shafarevich conjecture, as proved for curves and Abelian varieties by Faltings, for other classes of varieties. We first obtain analogues for certain Fano threefolds. We use these results to prove the Shafarevich conjecture for smooth sextic surfaces, which appears to be the first non-trivial result in the literature on the arithmetic of such surfaces. Moreover, we exhibit certain moduli stacks of Fano varieties which are not hyperbolic, which allows us to show that the analogue of the Shafarevich conjecture does not always hold for Fano varieties. Our results also provide new examples for which the conjectures of Campana and Lang–Vojta hold.

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