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The reduction of Hilbert modular varieties modulo a maximally ramified prime

We shall survey recent results (joint with F. Andreatta) on the geometry of the reduction of Hilbert modular varieties – varieties that parameterize abelian varieties with real multiplication by a given totally real field L. We shall focus on the geometry of their reduction modulo a prime which is maximally ramified in the field L. To study the geometry, we introduce a certain stratification that refines both the singularity stratification of Deligne-Pappas and the Newton stratification. We obtain detailed information on our stratification that allows better understanding of the singularities of the modular variety and of the Newton stratification; in particular, we get the dimension of the Newton stratification, confirming a general conjecture in this setting.