



Université Claude Bernard



HABILITATION A DIRIGER DES RECHERCHES

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Résumé

This memoir studies the hyper-Kähler varieties from the motivic, arithmetic and dynamic aspects. The first part concerns their Chow rings and Chow motives viewed as algebra objects. We provide several new perspectives to the Beauville–Voisin conjecture: via orbifold products, via comparison to abelian motives and via spreading to the universal family. Meaningful extensions as well as new evidences of this conjecture are obtained. The second part moves from complex geometry to positive characteristics: we develop the basic theory of supersingular hyper-Kähler varieties, propose a conjectural picture and provide evidences in the case of moduli spaces of sheaves. The third part establishes several finiteness results on the automorphism groups of hyper-Kähler manifolds, in particular the finiteness of real structures and the finite generation of automorphism groups. In the final part, by using derived categories, we provide a motivic characterization of isogenous K3 surfaces.