Gushel-Mukai varieties in characteristic p

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Résumé

I will try to explain some of the main ideas in joint work with Lie FU (Nijmegen), in which we prove the Tate conjecture for 6-dimensional Gushel-Mukai varieties over finitely generated fields of characteristic $p > 5$. This is based on the strategy employed by Madapusi Pera in the case of *K3* surfaces, and it uses the beautiful work of Yves André on (families of) varieties with a motive of *K3* type. In order to carry out this programme, we need several basic results about Gushel-Mukai varieties in positive characteristic, and some of these pose an interesting challenge. For instance, our proof that these Gushel-Mukai varieties have no nonzero global vector fields is a tour de force, which relies on computer algebra, and we are unable to extend the main result to p=5 only because these calculations get out of control.

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