Preface

In this text, we define the Heegner module of an elliptic curve over a global field. For global ground fields of positive characteristic, Drinfeld proved that certain elliptic curves are the images of Drinfeld modular curves. On these modular curves are points corresponding to Heegner points on classical modular curves. These points, called Drinfeld-Heegner points, correspond to generators of the Heegner module of the elliptic curve. Furthermore, for the case of a Weil elliptic curve over the rational field $\mathbb{Q}$, the Heegner module of the curve is generated by the corresponding Heegner points.

The cohomology of the Heegner module of an elliptic curve over a global field induces elements in the cohomology of the elliptic curve. As an application, we prove the Tate conjecture for a class of elliptic surfaces over finite fields. This case of the Tate conjecture is essentially equivalent to the conjecture of Birch and Swinnerton-Dyer for a corresponding class of elliptic curves over global fields and is also equivalent to the finiteness of the Tate-Shafarevich groups of these elliptic curves. This application is parallel to V.A. Kolyvagin's proof of the conjecture of Birch and Swinnerton-Dyer for a class of Weil elliptic curves over the field of rational numbers.

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