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Quaternionic diagonal cycles and explicit reciprocity laws

In the early nineties, Kato's Euler system of Beilinson elements and the theory of Heegner points revolutionised the arithmetic of (modular) elliptic curves over the rationals. For instance, the former led Kato to proving instances of the Birch and Swinnerton-Dyer conjecture for twists of elliptic curves over \mathbb{Q} by finite order characters. While the theory of Heegner points was generalised to elliptic curves E/F defined over totally real number fields, Kato's result hasn't found its natural extension to twists of E/F yet.

More recently, the theory of diagonal cycles, arising from the work and collective effort of Bertolini, Darmon, Rotger, Seveso, and Venerucci, has proven to be a fertile environment for proving new instances of the Birch and Swinnerton-Dyer conjecture for elliptic curves over the rationals. The aim of this talk is to discuss joint work in progress with Daniel Barrera, Santiago Molina, and Victor Rotger on the generalisation of the theory of diagonal cycles to quaternionic Shimura curves over totally real number fields F and its application to extending Kato's result for twists of elliptic curves E/F by Hecke characters of F of finite order.