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Bounds for Mordell-Weil ranks via Fourier coefficients of automorphic forms on the metaplectic cover of GL_2.

Let E be an elliptic curve of conductor N defined over the rationals, K a quadratic extension of absolute discriminant D, and e the sign of the Hasse-Weil L-function of E over K. Given an integer c prime to N, assume there exists a ring class extension $K[c]$ of conductor c over K (as is always the case if K is imaginary). If $e = 1$ and ND is sufficiently large, then I will explain how to use bounds for the Fourier coefficients of automorphic forms on the metaplectic cover of GL_2 to show that the Mordell-Weil group $E(K[c])$ has rank zero, and in fact is trivial if K is real quadratic. (The latter setting is not accessible by Heegner point or Euler system techniques, and relies on recent work of Darmon-Rotger). The strategy here is to estimate average central values of self-dual Rankin-Selberg and triple product L-functions, and can be used to derive a more general class of results in the setting of CM fields, as I will also explain.