

**SIEGEL MODULARITY OF CERTAIN CALABI–YAU
THREEFOLDS OVER \mathbb{Q}**

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Abstract

This is a progress report on my ongoing research about the modularity of rank 4 and weight 3 Calabi–Yau motives over \mathbb{Q} .

We will consider a number of examples of Calabi–Yau threefolds defined over \mathbb{Q} having the Hodge numbers $h^{p,q} = 1$ for all pairs p, q with $p+q = 3$ (so $B_3 = 4$). Two of these Calabi–Yau threefolds are equipped with real multiplication by some real quadratic fields $K = \mathbb{Q}(\sqrt{d})$ with square-free integers $d > 1$, and satisfy the Hilbert modularity over K . Starting with the Hilbert modularity over K , we will establish the Siegel modularity over \mathbb{Q} of such Calabi–Yau threefolds that their (cohomological) L -functions coincide with the Andrianov L -functions of Siegel modular forms of weight 3, genus 2 on paramodular subgroups of level N of $Sp(4, \mathbb{Q})$.

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