Intersection of Arithmetic Cycles and Automorphic Forms December 12–16, 2005

Mini course on Arakelov geometry III

U. Kühn

kuehn@mathematik.hu-berlin.de Institut für Mathematik Humboldt-Universität zu Berlin Unter den Linden 6 100 99 Berlin GERMANY

Abstract

We present calculations of arithmetic intersection numbers on Hilbert modular surfaces by means of the cohomological arithmetic Chow rings with pre-log-log forms. These rely on the interplay of Borcherds products and arithmetic intersection theory. We show how to transform in certain cases the abstract formula for the star product of Green objects associated with Hirzebruch–Zagier divisors into quantities we can actually calculate. To complete our calculations at the finite places the arithmetic properties of the input space for the Borcherds lift to Hilbert modular forms are used in a vital way.