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Beilinson-Bloch conjecture for unitary Shimura varieties.

For certain automorphic representations π on unitary groups, we show that if $L(s, \pi)$ vanishes to order one at the center $s = 1/2$, then the associated π -localized Chow group of a unitary Shimura variety is nontrivial. This proves part of the Beilinson-Bloch conjecture for unitary Shimura varieties, which generalizes the BSD conjecture. Assuming the modularity of Kudla's generating series of special cycles, we further prove a precise height formula for $L'(1/2, \pi)$. This proves the conjectural arithmetic inner product formula, which generalizes the Gross-Zagier formula to Shimura varieties of higher dimension. We will motivate these conjectures and discuss some aspects of the proof. This is joint work with Yifeng Liu. (Received January 08, 2021)