

 COLUMBIA | MATHEMATICS

# ELLIS R. KOLCHIN MEMORIAL LECTURE



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Adjoint L-value and  
the Tate conjecture

**Abstract.** We sketch a proof of the Tate conjecture on algebraic cycles for a good amount of quaternionic Shimura varieties. A key point is a twisted adjoint L-value formula relative to each quaternion algebra  $D/F$  for a totally real field  $F$  and its scalar extension  $B = D \otimes_F E$  for a totally real quadratic extension  $E/F$ . The theta base-change lift of a Hilbert modular form  $f$  to  $B^\times$  has period integral over the Shimura subvariety  $Sh_D \subset Sh_B$  given by  $L(1, Ad(f) \otimes \left(\frac{E/F}{\cdot}\right)) \neq 0$ ; so,  $Sh_D$  gives rise to a non-trivial Tate cycle in  $H^{2r}(Sh_B, \mathbb{Q}_l(r))$  for  $r = \dim Sh_D = \dim Sh_B/2$ . We also present a conjectural description of all Tate cycles valid for all such  $B$ .

Wednesday, November 12th  
4:00 PM • Math Hall, Room 520