

ON THE BLOCH-KATO CONJECTURE FOR ELLIPTIC MODULAR FORMS OF SQUARE-FREE LEVEL

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ABSTRACT. Let $\kappa \geq 6$ be an even integer, M an odd square-free integer, and $f \in S_{2\kappa-2}(\Gamma_0(M))$ a newform. Let \mathcal{V} be the motive associated to f and let \mathcal{V}_λ be the λ -adic realization of \mathcal{V} where λ is a prime of residue characteristic ℓ . We prove that under some reasonable assumptions that half of the λ -part of the Bloch-Kato conjecture for $\mathcal{V}_\lambda(\kappa - 2)$ is true by bounding the ℓ -valuation of the order of the Bloch-Kato Selmer group of $\mathcal{V}_\lambda(\kappa - 2)$ below by the ℓ -valuation of relevant special value of the L -function of f . We prove this by constructing a congruence between the Saito-Kurokawa lift of f and a cuspidal Siegel modular form. This is join work with Jim Brown.