

# Towards mod $p$ Local Global Compatibility for Partial Weight one Hilbert Modular Forms

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Let  $p > 5$  be a prime, and let  $F$  be a totally real field in which  $p$  is unramified. We study mod  $p$  Hilbert modular forms for  $F$  of level prime to  $p$  and weight  $(k, l)$ , where  $k$  and  $l$  are tuples of integers. To a mod  $p$  Hilbert modular Hecke eigenform of weight  $(k, l)$ , Diamond and Sasaki associate a two-dimensional mod  $p$  Galois representation of  $\text{Gal}(Fp/F)$ . The local-global compatibility (LGC) conjecture predicts that, at each place above  $p$ , the restriction of this representation admits crystalline lifts with Hodge–Tate weights determined explicitly by  $(k, l)$ . In this talk, we will discuss a proof showing that LGC for regular  $p$ -bounded weights (each entry of  $k$  between 2 and  $p + 1$ ) implies LGC in the partial weight one  $p$ -bounded case (each entry of  $k$  between 1 and  $p + 1$ ). Our approach combines computations of scheme-theoretic intersections on the Emerton–Gee stack with weight-changing arguments on quaternionic Shimura varieties, using restriction to Goren–Oort strata. This is joint work in progress with Brandon Levin and David Savitt.

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