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Colmez' conjecture in average

This is a report on a joint work with Xinyi Yuan on a conjectured formula of Colmez about the Faltings heights of CM abelian varieties. I will sketch a deduction of this formula in average of CM types from our early work on Gross-Zagier formula. When combined with a recent work of Tsimerman, this result implies the Andre-Oort conjecture for the moduli of abelian varieties.

Our method is different than a recently announced proof of a weaker form of the average formula by Andreatta, Howard, Goren, and Madapusi Pera: we use neither high dimensional Shimura varieties nor Borcherds' liftings.