

# Counting curves over finite fields and cohomology of moduli spaces

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Abstract:

Let  $F$  be a finite field with  $q$  elements ( $q$  small). Computer counts of how many curves of genus 2 there are over  $F$  and how many points they have over  $F$  and its quadratic extension allow us to write down convincing guesses for the ‘motivic’ Serre polynomials of all irreducible symplectic local systems on  $M_2$  of weight  $\leq 14$ . In weight 16, there is one local system whose Serre polynomial includes a new motive. We hope to be able to prove some of these guesses, thereby extending the work of Getzler, who determined the Serre polynomials for the local systems of weight  $\leq 2$ . This is joint work with S. del Baño and G. van der Geer.