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WORKSHOP ON COUNTING POINTS: THEORY, ALGORITHMS AND PRACTICE
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Improving the Weil bound for Artin–Schreier curves

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For the Artin–Schreier curve $y^p - y = f(x)$ over a finite field F_q of characteristic p , the celebrated Weil bound for the number of F_q -rational points can be sharp, especially in supersingular cases. In this lecture, we explain when and how the Weil bound can be significantly improved, using ideas from moment L -functions. Roughly speaking, we show that in favorable cases (which happens often), one can remove an extra square root p factor in the error term.

This is joint work with Antonio Rojas–Leon.