

# ON PATTERSON'S CONJECTURE: SUMS OF EXPONENTIAL SUMS.

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ABSTRACT. It is well known that for an exponential sum with a prime modulus the best bound for the sum comes from Weil's famous estimation. In this talk, we discuss when this bound can be improved on average over integral modulus in a number field. Investigations into exponential sums on average, or sums of exponential sums, have many applications including the Riemann hypothesis and the Ramanujan conjecture for automorphic forms.

In particular, we will get an asymptotic for sums of quartic exponential sums over the Gaussian integers. Tools we will use to get this asymptotic include automorphic forms and the trace formula.

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