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Fourier optimization and prime gaps

Fourier optimization problems appear naturally within several different fields of mathematics, particularly in analysis and number theory. These are problems in which one imposes certain conditions on a function and its Fourier transform, and then wants to optimize a certain quantity. A recent example is given in the proof of the optimal sphere packing in dimensions 8 and 24. In this talk I want to show how certain optimization problems of this sort appear naturally in connection to the question of bounding the maximal gap between consecutive primes, under the Riemann hypothesis. In particular, we improve the best known bounds for this problem, that dates back to the works of Cramér in the 1920's. This is a joint work with M. Milinovich (Univ. of Mississippi) and K. Soundararajan (Stanford Univ.)