

# NOTES ON RESTRICTION THEORY IN THE PRIMES

OLIVIER RAMARÉ (CNRS/Aix-Marseille Université)

ABSTRACT: We study the mean  $\sum_{x \in \mathcal{X}} |\sum_{p \leq N} u_p e(xp)|^\ell$  when  $\ell$  covers the full range  $[2, \infty)$  and  $\mathcal{X} \subset \mathbb{R}/\mathbb{Z}$  is a well-spaced set, providing a smooth transition from the case  $\ell = 2$  to the case  $\ell > 2$  and improving on the results of J. Bourgain and of B. Green and T. Tao. A uniform Hardy-Littlewood property for the set of primes is established as well as a sharp upper bound for  $\sum_{x \in \mathcal{X}} |\sum_{p \leq N} u_p e(xp)|^\ell$  when  $\mathcal{X}$  is small.

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