

# On some exponential sums over prime powers and applications

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**ABSTRACT:** Let  $\Lambda$  be the von Mangoldt function and  $N, \ell \geq 1$  be integers. We will see some recent theorems on additive problems with prime and prime powers obtained by Languasco and Zaccagnini using the original Hardy-Littlewood circle method function, *i.e.*

$$\tilde{S}_\ell(\alpha) = \sum_{n=1}^{\infty} \Lambda(n) e^{-n^\ell/N} e(n^\ell \alpha), \quad (1)$$

where  $e(x) = \exp(2\pi i x)$ . We'll compare such results with the weaker ones that can be obtained using finite sums like

$$S_\ell(\alpha) = \sum_{n=1}^N \Lambda(n) e(n^\ell \alpha), \quad (2)$$

this way explaining in which cases the (1)-approach could lead to sharper results.

## References

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