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*An extension to the Brun–Titchmarsh theorem*

The Siegel–Walfisz theorem states that for any  $B > 0$ , we have  $\sum_{p \leq x, p \equiv d \pmod{v}} 1 \sim x/\varphi(v) \log(x)$  for  $v \leq \log^B(x)$  and  $(v, d) = 1$ . This only gives an asymptotic formula for the number of primes in an arithmetic progression for quite a small modulus  $v$  compared to  $x$ . However, if we are concerned only with an upper bound, the Brun–Titchmarsh theorem says that for any  $1 \leq v \leq x$ , we have  $\sum_{p \leq x, p \equiv d \pmod{v}} 1 \ll x/\varphi(v) \log(x/v)$ . In this talk, we will discuss an extension to the Brun–Titchmarsh theorem that concerns the number of integers with exactly  $s$  distinct prime factors in an arithmetic progression.

This is joint work with Kai Man Tsang and Tsz Ho Chan.