1096-11-441 **James Maynard*** (maynard@maths.ox.ac.uk). *Sieve weights in the GPY method and small gaps between primes.*

Goldston, Pintz and Yıldırım introduced the 'GPY method' to show the existence of small gaps between primes, and this was spectacularly used in the recent breakthrough of Zhang. A key part of the GPY method is the use of Selberg-style sieve weights $w_n = (\sum_{d|P(n)} \lambda_d)^2$, where P is a fixed polynomial and λ_d are real constants which we can choose freely. If one restricts to a choice of λ_d of the shape $\lambda_d = \mu(d)f(d)$ with f a smooth function, then the optimal choice of f is given in terms of Bessel functions.

We introduce a different choice of weights which perform better than the Bessel function choice. One application of these weights shows that, under the Elliott-Halberstam conjecture, there are infinitely many pairs of primes which differ by at most 12 (the previous record being 16). (Received September 03, 2013)