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On the estimate for a mean value relative to 4/p=1/n_1+1/n_2+1/n_3

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For the positive integer n, let $f(n)$ denote the number of positive integer solutions (n_1, n_2, n_3) of the Diophantine equation $$ {4\over n}={1\over n_1}+{1\over n_2}+{1\over n_3}. $$ For the prime number p, $f(p)$ can be split into $f_1(p)+f_2(p),$ where $f_i(p)(i=1, 2)$ counts those solutions with exactly i of denominators n_1, n_2, n_3 divisible by $p.$
Recently Terence Tao proved that $$ \sum_{p< x}f_1(p)\ll x\exp({c\log x\over \log\log x}) $$ with other results. In this paper we shall improve it to $$ \sum_{p< x}f_1(p)\ll x\log^5x\log\log^2x. $$

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