1077-11-406 **Carl Pomerance*** (`carl.pomerance@dartmouth.edu`). *Dense product-free sets.*

A subset S of a ring R is *product free* if $ab \neq c$ whenever $a, b, c \in S$. How large can S be when $R = \mathbb{Z}/n\mathbb{Z}$ or $R = \mathbb{Z}$? It is easy to come up with examples of product-free sets of integers with asymptotic density $1/2$, and in $\mathbb{Z}/n\mathbb{Z}$ with almost $n/2$ elements. For example, if p is an odd prime, the quadratic nonresidues for p form a product-free subset of $\mathbb{Z}/p\mathbb{Z}$ of size $(p-1)/2$. So, "1/2" seems to be a natural guess, and in a recent paper with A. Schinzel we proved this for $\mathbb{Z}/n\mathbb{Z}$ for a very large proportion of numbers n and for all $n \leq 9 \times 10^8$. However, in new work with P. Kurlberg and J. Lagarias, we show that for each $\epsilon > 0$, there are numbers n with product-free subsets of $\mathbb{Z}/n\mathbb{Z}$ of size $> (1-\epsilon)n$. The smallest example we were able to find that beats $n/2$ has $n \approx 10^{1.61 \times 10^8}$. If n_ϵ is the least n that beats $(1-\epsilon)n$, we show that n_ϵ tends to infinity about doubly exponentially in $1/\epsilon^{17}$. (Received September 08, 2011)