1035-11-1139 **Joshua D. Batson*** (`joshua.batson@yale.edu`), 20282 Carol Lane, Saratoga, CA 95070.
Nathanson Heights in Finite Vector Spaces.

Let p be a prime, and let $\mathbb{Z}_p$ denote the field of integers modulo p. The *Nathanson height* of a point $v \in \mathbb{Z}_p^n$ is the sum of the least nonnegative integer representatives of its coordinates. The Nathanson height of a subspace $V \subseteq \mathbb{Z}_p^n$ is the least Nathanson height of any of its nonzero points. In this paper, we resolve a conjecture of Nathanson [M. B. Nathanson, Heights on the finite projective line, International Journal of Number Theory, to appear], showing that on subspaces of $\mathbb{Z}_p^n$ of codimension one, the Nathanson height function can only take values about $p, p/2, p/3, \ldots$. We show this by proving a similar result for the coheight on subsets of $\mathbb{Z}_p$, where the *coheight* of $A \subseteq \mathbb{Z}_p$ is the minimum number of times A must be added to itself so that the sum contains 0. We conjecture that the Nathanson height function has a similar constraint on its range regardless of the codimension, and produce some evidence that supports this conjecture. (Received September 18, 2007)