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Craig M Timmons* (ctimmons@ucsd.edu). *k-fold Sidon sets*.

Let G be an abelian group. A set $A \subset G$ is a *k-fold Sidon set* if A has only trivial solutions to equations of the form

$$c_1x_1 + c_2x_2 + c_3x_3 + c_4x_4 = 0$$

where $|c_i| \leq k$ and $c_1 + c_2 + c_3 + c_4 = 0$. Such sets were introduced by Lazebnik and Verstraëte in 2003 while investigating hypergraphs of girth 5. In this talk we will present some upper and lower bounds on the maximum size of a k -fold Sidon set contained in the interval $\{1, 2, \dots, N\}$ and in the group \mathbb{Z}_N . We will present an application of such sets to the following problem in extremal graph theory: determine the maximum number of edges in an n -vertex graph such that every edge is in a unique 4-cycle. (Received December 17, 2012)