1007-11-237   **Ernest S Croot***, Georgia Institute of Technology, School of Mathematics, 267 Skiles, Atlanta, GA 30332. *Sets with Few Three-term Arithmetic Progressions Contain Long Arithmetic Progressions.*

Let t be a density, which is a real number in $(0, 1]$. Then, for all sufficiently large primes p the following holds: Let S be a subset of the integers modulo p having density at least t (that is, having at least tp elements) and having the least number of three-term arithmetic progressions modulo p among all other sets with at least tp elements. We will call such a set S a critical set for the density t. In this talk I will show that such a set S must contain an arithmetic progression of length at least $(\log p)^{1/4+o(1)}$, which is quite a bit longer than the best that is known for a generic set of density at least t. (Received February 22, 2005)

1