

1121-05-24

**Pete L. Clark** (plclark@gmail.com), **Aden Forrow** (aforrow@math.mit.edu) and **John R. Schmitt\*** (jschmitt@middlebury.edu). *Chevalley-Waring Meets Hypergraphs: Counting Sub-hypergraphs with Union Cardinality 0 Modulo  $q$ .*

Let  $q$  be a prime power and let  $\mathcal{F} = \{F_1, \dots, F_n\}$  be a hypergraph (i.e.  $\mathcal{F}$  is a finite collection of finite subsets of some fixed set) with maximal degree  $d$ . We show that the number of non-trivial sub-hypergraphs  $\mathcal{F}_0$  with  $|\cup_{F \in \mathcal{F}_0} F| \equiv 0 \pmod{q}$  is either 0 or exponentially many. To do this we use **the polynomial method** and an extension of a classical number-theoretic result of Ewald Warning. As a result, we recover a theorem of Alon, Kleitman, Lipton, Meshulam, Rabin and Spencer that computes the minimal value of  $n$  for which we are guaranteed to have a non-trivial sub-hypergraph meeting the condition. (Received June 29, 2016)