

1135-05-2051      **Joshua A. Grochow\*** (jgrochow@colorado.edu), 1111 Engineering Drive, ECOT 717, 430  
UCB, Boulder, CO 80309-0430. *The Cap Set Conjecture, the polynomial method, and applications*  
(after Croot-Lev-Pach, Ellenberg-Gijswijt, and others).

The card game Set asks players to find lines in a subset - drawn from a deck of cards - of the four-dimensional vector space over the integers mod 3. In n-dimensional generalized Set, we get the seemingly-innocuous cap set question: how large can a subset of  $(\mathbb{Z}_3)^n$  be and still contain no lines? This question stood open for 30 years; in this talk, we'll see the beautiful, elementary, and wonderfully short proof of the Cap Set Conjecture (that the largest subset is exponentially smaller than the whole space), due to Ellenberg and Gijswijt, following on Croot-Lev-Pach. We will also see some of the many applications of the result and its proof, not only in combinatorics, but also in commutative algebra, the geometry of tensors, and computational complexity. Little background will be assumed beyond linear algebra over the integers modulo a prime. (Received September 25, 2017)